

## 1. Question

1 points

### Category: Surgery

A 25-year-old motorcyclist is brought to the emergency department after being involved in a collision with an automobile. On arrival he is in obvious pain. He expresses an urge to void, but is unable to do so. Genital examination shows blood at the urethral meatus and a scrotal hematoma. Rectal examination reveals a high riding prostate. Abdominal examination is suggestive of a distended bladder. Which of the following is the most likely diagnosis?

1. ☒ Urethral injury ☐
2. ☐ Intraperitoneal bladder rupture
3. ☐ Extraperitoneal bladder injury
4. ☐ Fracture of penis
5. ☐ Renal injury

**INCORRECT** ☐

**The correct answer is 1.**

This trauma patient has signs and symptoms suggestive of a posterior urethral injury. Urethral injuries can be classified broadly based on anatomic location. Injury to the anterior urethra, the portion of the urethra distal to the urogenital diaphragm, most commonly results from blunt trauma to the perineum (straddle injuries) or instrumentation of the urethra. Findings include perineal tenderness or hematoma, a normal prostate, and bleeding from the urethra. Patients may not complain of inability to urinate, and delayed presentations may be complicated by sepsis secondary to extravasation of urine into the scrotum, perineum and/or abdominal wall. The posterior urethra consists of the prostatic and membranous urethra. Posterior urethral injuries are commonly associated with fractures of the pelvis. Patients classically complain of suprapubic pain and an inability to void following major trauma. Examination will show blood at the urethral meatus, a high-riding prostate due to displacement of the prostate by a pelvic hematoma, and scrotal hematoma, in addition to signs and symptoms of pelvic fracture.

**(Choices 2 & 3)** Bladder injury can present with gross hematuria and may cause difficulty with urination but would not cause a distended bladder. Intraperitoneal bladder rupture would cause peritoneal signs.

**(Choice 4)** Penile fracture typically occurs secondary to trauma to the erect penis during intercourse. Patients will describe a snapping sound that is followed by pain, and deviation of the axis of the shaft due to hematoma formation.

**(Choice 5)** Patients with traumatic renal injuries present with hematuria, abdominal distention, flank pain and ecchymoses. There may also be a palpable flank mass.

## 2. Question

1 points

### Category: Surgery

A 3-week-old infant is brought in because of 2 days of protracted bilious vomiting. He looks acutely ill, and plain x-rays show two large air fluid levels in the upper abdomen, the larger one on the left side and a smaller one on the right side. The radiologist describes the finding as a “double bubble sign.” He also reports that there is intraluminal gas distal to those two air fluid levels, but that it is sparse and does not outline distended loops. Which of the following is the most likely tentative clinical diagnosis?

1. ☐ Hypertrophic pyloric stenosis
2. ☐ Intestinal atresia
3. ☐ Malrotation ☐
4. ☐ Meconium ileus
5. ☐ Necrotizing enterocolitis

**INCORRECT** ☐

**The correct answer is 3.**

The double bubble sign with a little gas beyond is highly suggestive. The diagnosis must be promptly confirmed (by barium enema or contrast study from above) so that emergency surgery can be performed before the bowel dies twisted on its vascular pedicle. This condition can be present at birth or it can also show up later, as in this example.

**(Choice 1)** is suggested by the age (it presents at 3 weeks). However, the vomiting would have been projectile and free of bile, and x-ray films would have shown only gastric distention.

**(Choice 2)** shows up at birth, and the x-ray films show multiple air fluid levels.

**(Choice 4)** is also obvious earlier in life, but the infant would have cystic fibrosis, an unused microcolon, and inspissated meconium in the ileum giving a ground glass appearance in the x-ray films.

**(Choice 5)** occurs in the premature infant when first fed.

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## 3. Question

1 points

### Category: Surgery

A 45-year-old male comes to the hospital because of severe retrosternal chest pain that started suddenly a few hours ago. He says that he has been having mild chest pain for the past few days, but that this pain is completely different. His past medical history is significant for nonischemic cardiomyopathy for which he takes furosemide, carvedilol, spironolactone, lisinopril and potassium



chloride. He also has HIV infection but is not taking any medications related to this diagnosis by his own choice. On physical examination, his temperature is 38.9°C (102°F), blood pressure is 110/65 mm Hg, pulse is 110/min, and respirations are 22/min. He is in obvious distress secondary to pain. His lungs are clear to auscultation and the remainder of his physical examination is unremarkable. His EKG is within normal limits. Chest X-ray shows a widened mediastinum and mediastinal air. Which of the following is the most appropriate next step in the management of this patient?

1. ☐ Gastrografin contrast esophagogram ☐
2. ☐ Barium swallow study
3. ☐ Upper gastrointestinal endoscopy
4. ☐ Transesophageal echocardiogram
5. ☐ Bronchoscopy

**INCORRECT** ☐

**The correct answer is 1.**

Esophageal perforation is a condition that causes sudden-onset, severe, unrelenting pain that is located retrosternally or in the neck, back or abdomen. The pain is often exacerbated by swallowing. Because of these nonspecific presenting symptoms, the differential diagnosis at the time of presentation often includes myocardial infarction, dissecting aortic aneurysm, pulmonary embolism or surgical abdomen. More specific signs of esophageal perforation include subcutaneous emphysema in the neck or a characteristic crunching sound on auscultation of the heart due to mediastinal emphysema (Hamman's sign). Chest x-ray is rarely diagnostic; findings may include air in the paraspinal muscles, a widened mediastinum, pneumomediastinum, pneumothorax or pleural effusions. The diagnosis of esophageal perforation is confirmed with a Gastrografin esophagogram, which will demonstrate contrast leakage at the site of perforation. Patients with this condition require immediate broad-spectrum antibiotic therapy and surgical repair. Esophagitis is a condition that predisposes to esophageal perforation. This particular patient may have pill induced esophagitis secondary to potassium chloride and/or infectious esophagitis secondary to Candidal infection related to his HIV disease.

**(Choice 2)** Even though barium study is more sensitive for diagnosing small perforations it is not used as first line because of the risk of mediastinal inflammation. Gastrografin is water soluble and less irritating to mediastinum.

**(Choice 3)** Upper gastrointestinal endoscopy and other types of esophageal instrumentation are the most common cause of esophageal perforation.

**(Choice 4)** Transesophageal echocardiography is used to image the posterior heart and to examine small valvular vegetations (provides higher resolution than transthoracic echocardiography).

**(Choice 5)** Bronchoscopy helps to assess the conducting airways for pathology like tumors, hemorrhage, obstructions, trauma or infection.

#### 4. Question

1 points

##### Category: Surgery

Ever since she was a toddler, a girl has been nagged by her mother to stand up straight. As she became older, she had little interest in sports because of shortness of breath. She also constantly complained that the shorts and slacks her mother purchased for her were shorter in one leg than the other. In the sixth grade, at the age of 12 years, a school nurse asked her to strip to the waist and bend forward at a 90-degree angle while she looked at her back. On the basis of this examination, the nurse called in her parents to recommend that the girl see an orthopedic surgeon. Which of the following is the most likely diagnosis suspected by the nurse?

1. ☐ Ankylosing spondylitis
2. ☐ Pott's disease of the spine
3. ☐ Idiopathic scoliosis ☐
4. ☐ Osteomyelitis
5. ☐ Neurofibromatosis

**INCORRECT** ☐

**The correct answer is 3.**

The nurse suspects that the patient has idiopathic scoliosis. The school screening test for this disorder is called the Adam's forward-bending test. By assuming this near 90-degree bent position, abnormal lateral curvature (S or C shape) of the spine is easy to observe. Confirmation is generally made by an imaging study in which the degree of curvature is determined by a geometrical process called the Cobb method. A curvature greater than 25 degrees is considered significant, greater than 45–50 degrees is considered severe. Scoliosis is most commonly idiopathic and often is first diagnosed in adolescent girls from 10 to 16 years of age. Scoliosis refers to lateral displacement of the spine, while kyphosis refers to forward displacement (e.g., hunchback) of the spine. A third type of unusual spinal shape is called lordosis (aka, sway back); this is not considered pathologic as long as the back remains flexible.

**(Choice 1)** is a human leukocyte antigen (HLA)-B27–positive arthropathy that is more common in men. Sacroiliitis and fusion of the spine (bamboo spine) are prominent features of this disease. Forward bending of the spinal column becomes increasingly more pronounced as the disease progresses.

**(Choice 2)** refers to tuberculosis involving the vertebral column.

**(Choice 4)** does not typically produce spinal abnormalities.

**(Choice 5)** is associated with kyphoscoliosis; however, café au lait spots are likely to be present as well.

## 5. Question

1 points

### Category: Surgery

A 65-year-old man was seen by his family physician with a 6-month history of constipation and a recent history of pain in the left lower quadrant of his abdomen. The patient complained of weakness and fever as well. He smoked approximately two packs of cigarettes per month and consumed a six-pack of beer during weekends. Physical examination revealed a moderately obese man. His blood pressure was 138/90, pulse 76/min regular, respirations 16/min, and temperature 100°F (37.8°C). His cardiovascular and respiratory systems were normal. Examination of the abdomen revealed tenderness in the left lower quadrant with a positive rebound. In addition, a tender mass was felt on rectal examination. A complete blood count revealed neutrophilic leukocytosis, and the stool guaiac test result was negative. The most likely diagnosis in this patient is:

1. ☐ Ulcerative colitis
2. ☐ Irritable bowel syndrome
3. ☐ Acute diverticulitis ☐
4. ☐ Carcinoma colon
5. ☐ Ischemic colitis

**INCORRECT** ☐

**The correct answer is 3.**

The patient has acute diverticulitis. Herniation of the colonic mucosa through the circular muscles of the colon leads to the formation of diverticula. In Australia, about 95% of these are located in the sigmoid colon, but among Koreans, Japanese, Chinese, and Malaysians, they are twice as likely to form in the ascending colon. In some severely affected individuals, the entire colon may be involved; however, diverticula are not found in the rectum because it has a complete circular layer of muscle. Diverticula usually form due to a lack of roughage in the diet. The high fiber content of typical African and Indian diets makes diverticular disease a rarity in these cultures. When one or more diverticula get inflamed, the term diverticulitis applies. The clinical presentation in diverticulitis is similar to that of acute appendicitis, except that it is on the left side. Pyrexia, malaise, and leukocytosis are features. Sometimes a tender mass may be palpable on rectal examination. Presence of urinary symptoms, such as dysuria, may be a forerunner to the formation of a vesicocolic fistula. In such cases, the patient would develop pneumaturia and pass flatus or even fecal material in the urine. The diagnosis is made on clinical grounds. Computed tomography (CT) confirms the diagnosis and also delineates associated pericolic abscesses. Although very mild cases may be

treated at home with oral antibiotics and a liquid diet, more commonly, acute diverticulitis is treated in a hospital setting with intravenous antibiotics, a combination of cefuroxime and metronidazole. Once the acute attack has resolved, a barium enema and flexible sigmoidoscopy or colonoscopy should be performed. Doing so in the acute phase could result in perforation and peritonitis. Surgery is indicated in approximately 10% of patients. Such surgery is performed during a quiescent period after careful bowel preparation; it consists of a one-stage resection and end-to-end anastomosis. If there is bowel obstruction, a Hartmann's procedure is performed. If the patient has fecal peritonitis, the options include primary resection and Hartmann's procedure or, in rare cases, primary resection and anastomosis.

**(Choice 1)** is incorrect; ulcerative colitis is a nonspecific inflammatory disease that usually affects adults between the ages of 20 and 40. Both sexes are equally affected. In approximately 95% of cases, it commences in the rectum and spreads proximally. In chronic cases, pseudopolyps occur (chronic inflammatory polyps). The sine qua non of this disease is bloody diarrhea and rectal discharge that may be blood-stained or foul smelling. Pain is not an early symptom of the disease. The disease is characterized by exacerbations and remissions. In severe cases, mild-grade fever, tachycardia, and hypoalbuminemia could occur. Other complications include toxic megacolon, perforation, and rarely, severe hemorrhage. Carcinoma can occur in those who develop the disease early in life or if the malady involves the whole colon. Colonoscopy and biopsy have an important role to play in the diagnosis of ulcerative colitis.

**(Choice 2)** is incorrect. Irritable bowel syndrome (IBS) is the most common gastrointestinal disease seen in clinical practice. It usually begins before the age of 30. Women are twice as likely to suffer from it as are men. Patients with IBS may have psychiatric disorders such as hysteria, obsessive-compulsive disorder, and depression. There are three types of presentation: (a) chronic abdominal pain and constipation (spastic colon), (b) alternating constipation and diarrhea, and (c) chronic painless diarrhea. The patients may also complain of abdominal distention, a feeling of incomplete evacuation, and relief of abdominal pain with evacuation. The diagnosis is based on the Rome criteria and is one of exclusion. Barium enema and colonoscopy are required to exclude inflammatory or neoplastic disease. Treatment includes a high-fiber diet, psyllium extract, and anticholinergics. Psychiatric consultation is indicated in appropriate cases.

**(Choice 4)** is incorrect; carcinoma of the colon is most commonly seen on the left side. It is usually of the stenosing type. Thus, the predominant symptoms are that of progressive intestinal obstruction. In approximately 15% of cases, diverticular disease and colon carcinoma coexist. Loss of weight, positive occult blood test result, and a falling hematocrit should raise concerns about this possibility. Additional features include change in bowel habit, such as alternating constipation and diarrhea, colicky pain, and tenesmus (need for evacuation), especially if the tumor is located low in the descending colon. In the latter case, patients may pass blood and mucus, mucus being more common in the morning. If a mass is felt on rectal examination, it will not be tender. Double-contrast barium enema is carried out in patients who have such altered bowel habits, and colonoscopy is indicated in those who have bleeding per rectum. Ultrasonography is used to exclude the presence of hepatic metastases, while CT is indicated in patients who have large palpable masses in the abdomen.

**(Choice 5)** also is incorrect; ischemic colitis results from paucity of blood flow to the colon. The most common location is at the splenic flexure. The patient is usually in the sixth decade of life and has degenerative vascular disease. Rectal bleeding and infrequent colicky abdominal pain and vomiting may precede a dramatic onset. Pain may occur several hours after a meal. The onset is usually abrupt, with severe lower abdominal pain, vomiting, fever, and bleeding per rectum. Tenderness and guarding of the abdomen will be noted, and bowel sounds may be decreased. An arteriogram confirms the diagnosis. Most cases resolve spontaneously. Treatment is supportive. Some of these patients could develop strictures that would require surgery.

## 6. Question

1 points

### Category: Surgery

An 18-year-old woman presents to the emergency department with a history of severe retrosternal chest pain that is aggravated by swallowing and deep breathing. The patient appears anxious. She is afebrile, has sinus tachycardia, slightly elevated blood pressure, and tachypnea. Mild pallor is noted, but she seems well hydrated and has no icterus. Examination of the cardiovascular system had normal findings, except for sinus tachycardia. The abdomen is scaphoid, and no tenderness, masses, or organomegaly is noted. Her weight is less than the norm for her age and height. The patient, however, feels that she is obese and has taken to binge eating followed by self-induced vomiting. Which of the following is the most probable cause of her pain?

1. ☐ Gastroesophageal reflux
2. ☐ Boerhaave syndrome ☐
3. ☐ Tension pneumothorax
4. ☐ Gastric ulcer disease
5. ☐ Esophageal cancer

**INCORRECT** ☐

**The correct answer is 2.**

Boerhaave syndrome refers to a full-thickness rupture of the distal thoracic esophagus or stomach and is associated with vomiting or retching. In most cases, this syndrome is associated with alcoholics who have forceful vomiting or retching. However, it is also the most serious complication of bulimia nervosa, an eating disorder associated with bingeing on excessive amounts of food followed by self-induced vomiting.

**(Choices 1,3,4 & 5)** Gastroesophageal reflux, tension pneumothorax, gastric ulcer disease, and esophageal cancer all may cause retrosternal pain but are not associated with vomiting and bulimia.

## 7. Question

1 points

### Category: Surgery

A 62-year-old man complains of right knee pain. He says that the pain started two days ago and has been limiting his daily activities. He required 2 grams of acetaminophen in order to sleep through the previous night. He has a long history of rheumatoid arthritis treated with daily low-dose prednisone. Physical examination reveals swelling, limited flexion, and tenderness to palpation of the right knee. Synovial fluid aspiration is performed. Which of the following synovial fluid characteristics would warrant immediate surgical intervention?

1. ☐ High viscosity
2. ☒ 15,000 neutrophils per mcL ☐
3. ☐ Negatively birefringent crystals
4. ☐ 1500 WBC per mcL
5. ☐ Positive rheumatoid factor

**INCORRECT** ☐

**The correct answer is 2.**

Synovial fluid analysis is essential in managing monoarticular arthritis because the fluid characteristics dictate treatment. For example, septic arthritis warrants antibiotic therapy and surgical washout of the joint whereas other types of arthritis can be managed conservatively with painkillers alone. The table below describes the synovial fluid findings in different types of arthritis.

Synovial fluid	Normal	Noninflammatory	Inflammatory	Septic
Appearance	Clear	Clear, yellow	Clear to opaque, yellow	Opaque, yellow to green
WBC/mcL	<200	<2000	>2000	>2000, often >50,000
Neutrophil (%)	<25	<25	≥ 50	≥ 75



Glucose (mg/dl)	Serum Concentration	Serum Concentration	Between 25 and serum level	<25
Gram stain/culture	Negative	Negative	Negative	Positive
Etiology	No pathology	Osteoarthritis. trauma	Rheumatic diseases, crystal arthritis	Bacterial infection

In line with the table above, the indications for surgical washout are: positive Gram stain or culture, glucose 75% neutrophils, or >50,000 leukocytes per mL.

**(Choice 1)** Inflammatory synovial fluid of any etiology infected or not, may have high viscosity.

**(Choice 3)** Negatively birefringent crystals are the hallmark of gouty arthritis. Gout is a highly inflammatory mono- or polyarticular arthritis. It can be treated with NSAIDs, prednisone, colchicine, or intra-articular steroids. Surgical intervention is not required.

**(Choice 4)** A low synovial fluid leukocyte count is not diagnostic of infection.

**(Choice 5)** Positive rheumatoid factor in the synovial fluid is suggestive of rheumatoid arthritis. This disease is treated with systemic agents, not local procedures.

## 8. Question

1 points

### Category: Surgery

An 85-year-old male is placed on mechanical ventilation after a complicated elective hernia repair. After five days of endotracheal intubation with mechanical ventilation, the ratio of the rate of carbon dioxide produced to the rate of oxygen uptake is 1.05. What is the best explanation for these findings?

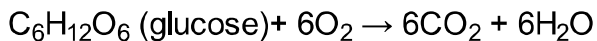
- ☐ Sepsis
- ☐ High-protein tube feeding
- ☐ Carbohydrate excess in the diet ☐
- ☐ High inspired oxygen fraction
- ☐ Pulmonary atelectasis

INCORRECT ☐



### The correct answer is 3.

This mechanically ventilated patient has a respiratory quotient (RQ) of 1.05. The RQ is the steady-state ratio of carbon dioxide (CO<sub>2</sub>) produced to oxygen (O<sub>2</sub>) consumed per unit time and may be used to make assessments of the metabolism taking place in particular organs or in the body as a whole. In a steady resting state, this ratio depends mainly upon the major fuel being oxidized for ATP production. An RQ close to 1.0 indicates that carbohydrate is the major nutrient being oxidized. Metabolism of proteins alone yields an RQ of approximately 0.8 and oxidation of fatty acids alone for ATP production yields an RQ of approximately 0.7. The RQ for a given fuel is calculated by dividing the number of moles of CO<sub>2</sub> produced by the number of moles of O<sub>2</sub> required to oxidize one mole of substrate. An example using glucose is shown below:



Thus, the RQ for glucose is  $6\text{CO}_2/6\text{O}_2 = 1.0$ . Because the body normally utilizes a combination of fuels, the normal full-body steady-state RQ is typically near 0.8. The patient in question has an RQ in excess of 1.0, indicating that carbohydrates are serving as the sole source of fuel and net lipogenesis is occurring. Assessment of the RQ is important when attempting to wean patients from mechanical ventilation, as overfeeding, especially with carbohydrates, can cause excessive CO<sub>2</sub> production and make weaning more challenging. This factor is especially important in patients with preexisting lung disease.

**(Choice 1)** Sepsis is a hypermetabolic, hypercatabolic state wherein both body fat and protein is broken down in addition to glucose being oxidized. For this reason, the RQ in a septic patient is typically less than 1.0.

**(Choice 2)** A high protein diet (where amino acid oxidation is the predominant form of ATP production) gives an RQ close to 0.8.

**(Choice 4)** If tissue oxygen delivery is adequate to prevent anaerobic metabolism, then the RQ will not be affected by the FiO<sub>2</sub>. Increased O<sub>2</sub> delivery to the tissues does not equate with increased O<sub>2</sub> consumption by the tissues. The RQ is calculated using the amount of O<sub>2</sub> consumed, which is determined by the difference in the oxygen content of the arterial and venous blood.

**(Choice 5)** Massive atelectasis could affect respiratory gas exchange and alter blood gases, but once a new steady state is achieved, the RQ value would still depend only upon the nature and proportions of metabolic fuels being oxidized.

## 9. Question

1 points

### Category: Surgery

A 48-year-old man with alcoholic cirrhosis has several episodes of massive hematemesis. Upper gastrointestinal endoscopy confirms that he is bleeding from esophageal varices. Sclerosing injections fail to control the bleeding. After the patient has been transfused 7 units of packed red cells, he is subjected to an emergency side-to-side portacaval shunt. At the time of surgery he has a serum albumin level of 3.1 g/dL, a total bilirubin of 1.7 mg/dL, and a prothrombin time (PT) 2

seconds above the control. After surgery, the bleeding stops, and the patient wakes up briefly from the anesthetic but then lapses into a coma. The reason for his neurologic deterioration would most likely be revealed by a laboratory determination of which of the following?

1. ☐ Blood alcohol levels
2. ☐ Blood gases
3. ☐ Blood glucose
4. ☐ Serum ammonia ☐
5. ☐ Serum sodium

**INCORRECT** ☐

**The correct answer is 4.**

Portacaval shunts are very effective in decreasing the pressure in esophageal varices, and thus controlling bleeding from them. But the penalty paid for that diversion of blood flow is further impairment of liver function. One almost never sees cirrhotic patients come to surgery with normal liver function. And, if they are bleeding at the time, they also have a load of ammonia in the gut that has to be cleared by the liver. With the initial limited function, plus the trauma of surgery and the diversion of portal flow, ammonia (as well as other toxic substances) accumulates in the blood and leads to coma.

**(Choice 1)** would be relevant in an alcoholic who has been drinking up to the time that some unexpected event necessitates emergency surgery. If the patient comes to the operating room with high levels of alcohol in the blood, one can predict that delirium tremens (DTs) will occur 2 or 3 days later.

**(Choice 2)** Determination of blood gases is always the first thing to do when unexplained mental deterioration occurs after surgery. Hypoxia is very likely to be the culprit. In this case, however, we do not have an unexplained occurrence, but one rather predictable problem.

**(Choice 3)** Blood glucose comes to mind for the diabetic patient known to use insulin who suddenly goes into coma, or for the unknown patient brought to the emergency department in coma and with no history of what happened to him. Although it is true that hypoglycemia is seen in liver failure, it occurs at the very end of the spectrum, when all other parameters of liver function are grossly deranged.

**(Choice 5)** Rapid changes in serum sodium can cause coma, such as in the precipitous hyponatremia seen in water intoxication or the hypernatremia of profound dehydration. Neither of those are likely to occur, however, in the setting of this vignette.

A 73-year-old woman is seen in the outpatients department. She complains of altered bowel habit and weight loss. A colonoscopy is performed which identifies a large polyp. Polypectomy was not possible due to the patient being on warfarin for a metal heart valve. You are asked to re-book the patient for definitive management. Which one of the following statements pertaining to this scenario is correct?

1. ☐ Admission is required to monitor the patient while warfarin is stopped
2. ☐ Warfarin should be replaced with therapeutic doses of low molecular-weight heparin for 5 days prior to the procedure
3. ☐ An echocardiogram is required prior to the procedure to exclude valve thrombus
4. ☐ Conversion to unfractionated heparin infusion is required ☒
5. ☐ A computed tomography pneumocolon should be performed to identify/exclude further disease before a management decision is made

**INCORRECT** ☐

**The correct answer is 4.**

Conversion to unfractionated heparin infusion is required This is a common scenario encountered in any centre where procedural endoscopy is common. Removal of polyps can result in significant bleeding as the lesions are often well vascularized. Patients on warfarin require their INR to be normalized prior to an attempted procedure. In patients receiving warfarin for indications such as atrial fibrillation, warfarin must be stopped 5 days before the procedure. In patients with metal valves, however, the risk of thrombus formation on the valve during this time is too great, and therefore these patients should ideally be admitted and managed on a heparin infusion pump. This allows close, accurate and rapidly reversible anticoagulation which therefore minimizes the time that the patient's anticoagulation is below therapeutic levels in the peri-procedure period.

Low-molecular-weight heparin is not appropriate as it needs to be stopped 48 hours prior to the procedure, during which the patient would not be adequately anticoagulated. The echocardiogram is unnecessary, as is the CT pneumocolon. The patient requires an intervention; finding a further polyp on CT will not affect the need for polypectomy.

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## 11. Question

**1 points**

**Category: Surgery**

A 33-year-old male falls while riding his bicycle in the park, and presents to the emergency department. Physical examination reveals upper abdominal bruises. His abdomen is non-distended, soft, and mildly tender in the epigastrium. Abdominal CT scan does not reveal any abnormalities.

The patient is sent home with analgesic medications. He returns one week later with fever, shaking chills, poor appetite and deep abdominal pain. Which of the following is most likely related to this patient's symptoms?

1. ☐ Spleen rupture
2. ☐ Stomach perforation
3. ☐ Pancreatic laceration ☐
4. ☐ Small bowel necrosis
5. ☐ Meckel diverticulitis

**INCORRECT** ☐

**The correct answer is 3.**

Fever, chills and deep abdominal pain suggest a retroperitoneal abscess. Any form of blunt abdominal trauma can compress the neck and/or body of the pancreas against the vertebral column over which it lies. A pancreatic contusion, crush injury, laceration or transection may result. Abdominal CT scans done early following the traumatic insult may fail to detect a pancreatic injury. Serial CT scans are often required to detect the evolution of the injury (i.e., enlargement of the gland, parenchymal disruption, areas of diminished contrast perfusion and peripancreatic fluid collections). Serum amylase values are nonspecific, and do not assist in the diagnosis of pancreatic trauma. If blunt traumatic pancreatic injury is undetected initially, devitalized tissue or a pseudocyst resulting from such injury can become secondarily infected. A pancreatic abscess is a serious complication with a high mortality. Treatment is by immediate placement of a percutaneous drainage catheter, culture of the drained fluid, and ultimately surgical debridement.

**(Choice 1)** The spleen is the most commonly injured organ following blunt abdominal trauma. Initial CT would have diagnosed the injury. Delayed splenic rupture would cause acute left upper quadrant abdominal pain and possibly hypotension, but not signs of sepsis, as in this case.

**(Choice 2)** A gastric perforation would be more likely to occur in penetrating (rather than blunt) trauma. Furthermore, this condition would be evident during the initial presentation as an acute abdomen, with free air under the diaphragm on upright abdominal x-ray studies (or CT scan).

**(Choice 4)** Small bowel injury is less likely after blunt (as opposed to penetrating) trauma. One exception is the duodenum, which is almost entirely retroperitoneal. This segment of the small bowel is vulnerable to crush injury where it overlies the vertebral bodies. Such injuries may cause duodenal hematoma and obstruction.

**(Choice 5)** Meckel's diverticulitis is generally not a direct consequence of blunt abdominal trauma. It may mimic appendicitis by causing anorexia and midabdominal I right lower quadrant pain. Chills and other signs of sepsis typically do not occur.

## 12. Question

1 points

### Category: Surgery

A 68-year-old man comes to the emergency department because of sudden onset back pain. He has never had back pain before and denies any trauma. He does not feel well and feels "like he is going to die". His blood pressure is 70/40 mm Hg, pulse is 110/min and respirations are 20/min. On examination, the abdomen is tender to palpation and there is a large pulsatile mass. Which of the following is the most appropriate next step in management?

1. ☐ Fast track ultrasound
2. ☐ CT scan of abdomen
3. ☐ Abdominal angiogram
4. ☐ Laparotomy ☒
5. ☐ Resuscitate and re-evaluate

**INCORRECT** ☐

**The correct answer is 4.**

The patient in this vignette has a pulsatile abdominal mass and is hypotensive. This patient has a diagnosis of a ruptured abdominal aortic aneurysm (AAA) unless proven otherwise. Ruptured AAAs can present in numerous ways, mimicking various abdominal pathology. The classic presentation is with sudden-onset back pain that may be followed by syncope. When hypotension is present with a pulsatile mass, no further studies are indicated. The patient should be immediately taken to the operating room for an emergent laparotomy for repair of the aneurysm. Mortality with this condition is approximately 50%; early recognition and operative intervention are essential.

**(Choice 1)** Fast track ultrasound is a newer modality used in trauma. It can make a diagnosis of free abdominal fluid but cannot decipher the origin of the fluid or the damaged organ. It can detect an abdominal aneurysm and is the tool classically used to screen for and monitor AAAs.

**(Choices 2 & 3)** Laparotomy should not be delayed for any other studies or interventions in cases of ruptured AAA. Both of these studies are very time consuming and expose the patient to intravenous contrast, an intervention that itself is not without risk.

**(Choice 5)** Resuscitation can be done while the patient is being prepared for surgery. In cases of ruptured AAA, as in trauma, aggressive resuscitation can cause increased hemorrhage. The goal of resuscitation should be to maintain mentation and end organ perfusion without hypertension.

## 13. Question

1 points

## Category: Surgery

An otherwise healthy 28-year-old man comes to his physician because of painless enlargement of the right testis. He began to feel a sensation of heaviness in the right hemiscrotum approximately 6 months ago. Physical examination reveals diffuse enlargement of the right testis, but it is difficult to determine whether this is due to an intratesticular or extratesticular lesion. Which of the following is the most appropriate next step in diagnosis?

1. ☐ CT scanning
2. ☐ Serum levels of hCG, alpha-fetoprotein, and LDH
3. ☐ Scrotal ultrasonography ☐
4. ☐ Needle biopsy
5. ☐ Inguinal orchiectomy

INCORRECT ☐**The correct answer is 3.**

Ultrasonography is the most sensitive and least expensive method to discriminate between testicular and extratesticular masses. However, a physician should remember to first use a simple transillumination test for such a differential diagnosis. Fluid collections within the vaginal sac transilluminate, whereas testicular masses do not.

**(Choice 1)** is used to determine the spread of testicular tumors within the abdominal and thoracic cavity, but is of no use in the initial diagnosis of scrotal masses.

**(Choice 2)** Serum levels of hCG, alpha-fetoprotein, and LDH are important adjunct parameters in the diagnosis and subsequent management of testicular neoplasms. LDH may be elevated in seminomas and nonseminomas, alpha-fetoprotein is elevated in nonseminomas (especially yolk sac tumors), and hCG is elevated in nonseminomas (especially choriocarcinomas).

**(Choice 4)** is not an adequate diagnostic tool in this case. It may be used in the evaluation of azoospermia related to infertility problems.

**(Choice 5)** is performed once ultrasonography has established that scrotal enlargement is caused by an intratesticular tumor. This allows the most accurate pathologic diagnosis and appropriate management.

## 14. Question

1 points

## Category: Surgery



A 34-year-old man is brought to the emergency department after being involved in a motor vehicle collision. He has severe abdominal and left shoulder pain. His temperature is 36.0 °C (96.8 °F), blood pressure is 100/60 mm Hg, pulse is 110/min and respirations are 23/min. Examination shows tenderness in the left upper quadrant of the abdomen. An x-ray film of the chest shows fractures of the left 7th, 8th and 9th ribs. A CT scan of the abdomen is suggestive of splenic injury with some free fluid in the abdomen. He has not been vaccinated for H. Influenza or S. pneumoniae. Which of the following is the most important determinant for surgical versus non-surgical management in this patient?

1. ☐ Presence of left shoulder pain
2. ☐ Presence of free fluid in the abdomen
3. ☐ Presence of a rib fracture on chest x-ray
4. ☐ Unvaccinated status of the patient
5. ☒ Hemodynamic stability and hematocrit values

**INCORRECT** ☐

**The correct answer is 5.**

The spleen is the most commonly injured organ in cases of blunt abdominal trauma. Patients who have suffered a splenic injury classically complain of left upper quadrant pain; rib fracture may frequently accompany splenic injuries. Pain referred to the left shoulder may result from irritation of the left hemidiaphragm by hemorrhage. Patients who present in obvious hemorrhagic shock should undergo immediate laparotomy and splenectomy, but most patients are managed nonoperatively with close ICU monitoring and fluid resuscitation. Some patients who have a hemorrhage but are otherwise hemodynamically stabilized may be candidates for angiography, which can demonstrate the exact site of hemorrhage and be used to treat the hemorrhage by embolization. If a patient being treated with observation experiences hemodynamic instability unresponsive to a 2L saline bolus or otherwise requires a blood transfusion, then laparotomy is indicated for splenorrhaphy or splenectomy. Following splenectomy, patients are at a greater risk of infections by encapsulated organisms such as H. influenzae, S. pneumoniae and N. meningitidis. Appropriate vaccinations should be administered in all post-splenectomy patients.

**(Choice 1)** Referred shoulder pain associated with abdominal pathology (Kehr sign) results from irritation of the diaphragm, in this case by the bleeding spleen, which causes referred pain in the dermatomal distribution of the phrenic nerve roots ( C3 – C5).

**(Choice 2)** There is poor correlation between the amount of free fluid in the abdomen and the necessity for surgical intervention.

**(Choice 3)** Fractured ribs are commonly associated with splenic trauma but are not a determinant of surgical versus non-surgical intervention.

**(Choice 4)** Though post-splenectomy patients are at a higher risk of infection with capsulated organisms, the unvaccinated status of a patient with splenic trauma does not determine surgical versus non-surgical treatment. In general, splenectomy should be avoided



in all patients as the spleen has important immunologic and hematologic functions.

## 15. Question

1 points

### Category: Surgery

A 31-year-old man is brought to the emergency department after a motor vehicle accident. He sustained a severe head injury and, on arrival to the emergency department, has a Glasgow coma score of 8. His blood pressure is stable, and an urgent CT scan of the head reveals a large subdural bleed with evidence of a midline shift and cerebellar tonsillar compression. The patient is breathing spontaneously without any respiratory assistance and is not intubated. Which of the following is the most appropriate next step in management?

1. ☐ Obtain an urgent head MRI to evaluate for herniation
2. ☐ Administer IV mannitol
3. ☐ Perform endotracheal intubation and hyperventilation ☒
4. ☐ Induce a barbiturate coma
5. ☐ Initiate immediate surgical decompression

**INCORRECT** ☐

**The correct answer is 3.**

This patient has an intracranial bleed, signs of increased intracranial pressure (ICP), and evidence on a CT scan of impending herniation. This patient requires rapid lowering of his ICP. The most rapid method available is hyperventilation to lower PaCO<sub>2</sub>, which leads to decreased cerebral blood flow and ICP.

**(Choice 1)** is unnecessary since the head CT already showed clear signs of impending herniation. An MR scan adds nothing to the decision analysis and need for immediate therapy.

**(Choice 2)** is also an appropriate therapy in this case. However, mannitol has an onset of action approximately 90 minutes after dosing, which makes hyperventilation the mainstay of acute therapy.

**(Choice 4)** is used as a last resort to dramatically lower ICP. In cases of severe emergency, patients are mechanically ventilated and placed in a barbiturate coma so that maximal lowering of ICP can be attained.

**(Choice 5)** may be appropriate, but not until hyperventilation has begun. Like mannitol, surgical decompression (even as emergent surgery) is not immediate; therefore, therapy needs to be instituted during that interval.

## 16. Question

1 points

### Category: Surgery

A 62-year-old, right-handed man has transient episodes of paralysis of the right arm and inability to express himself. There is no associated headache. The episodes have sudden onset, last about 5 to 10 minutes, and leave no neurologic sequela. The patient is overweight and sedentary. He smokes one pack of cigarettes per day and has high cholesterol, but he is not hypertensive. The only abnormality in the physical examination is a bruit over the left carotid bifurcation. Which of the following is the most appropriate initial step in diagnosis?

1. ☐ CT scan of the head
2. ☒ Duplex scanning of the carotids
3. ☐ Echocardiogram
4. ☐ MRI of the brain
5. ☐ Aortic arch arteriogram

**INCORRECT** ☐

**The correct answer is 2.**

The history is that of transient ischemic attacks (TIAs), which are most commonly due to an ulcerated plaque at the carotid bifurcation or a stenosis greater than 70% of the lumen. For many years, an arteriogram was the only way to diagnose such lesions, but this invasive study sometimes can precipitate the very same stroke that carotid surgery was designed to prevent. Duplex scanning, a noninvasive alternative, is now available. Many patients can be fully diagnosed and operated on without ever needing an arteriogram. For those in whom the study is inconclusive, an arteriogram is the next step.

**(Choice 1)** CT scan is our best tool when intracranial bleeding is suspected, but the hallmark of such an event is extremely severe headache heralding the neurologic deficits.

**(Choice 3)** is indicated if the heart is suspected as the source of emboli. The left carotid (where the bruit is) is the likely source of the problem in this vignette.

**(Choice 4)** MRI is our choice when brain tumor is suspected. The history would be one of several months of increasingly severe headaches that are worse in the mornings, along with eventual development of projectile vomiting and blurred vision.

**(Choice 5)** Aortic arch arteriogram is required if there is evidence of involvement of the vertebral arteries (neurologic deficits involving visual cortex and cerebellum), or if less invasive studies do not provide a satisfactory explanation of the symptoms. It would not be the first test performed.

## 17. Question

1 points

## Category: Surgery

A 34-year-old unrestrained male driver is brought to the ER after a motor vehicle accident. His cervical spine is immobilized. At the scene of the accident, his blood pressure is 80/40 mm Hg and heart rate is 130/min. He is able to communicate and follows simple commands. Lungs are clear to auscultation. Abdominal wall ecchymosis is present. Abdomen is mildly distended. Bowel sounds are decreased. Neck veins are collapsed. After two liters of intravenous fluids, his blood pressure is 90/60 mm Hg. Which of the following is the most appropriate next step in management of this patient?

1. ☐ Laparoscopy
2. ☐ Laparotomy
3. ☐ Angiogram
4. ☐ X-ray films of the abdomen and pelvis
5. ☐ CT scan of the chest
6. ☐ Focused assessment with sonography ☐

INCORRECT ☐**The correct answer is 6.**

This patient's history of motor vehicle accident, abdominal wall ecchymosis, distended abdomen and decreased bowel sounds, is suspicious for blunt abdominal trauma.

Furthermore, collapsed neck veins and hypotension indicate hemodynamic instability. In a hemodynamically unstable victim of a motor vehicle accident with suspected blunt abdominal trauma, the appropriate management involves cervical spine immobilization, intravenous hydration and FAST (Focused Assessment with Sonography for Trauma). If hemoperitoneum is identified on ultrasound, the patient should then undergo laparotomy. If ultrasound is inconclusive, then diagnostic peritoneal lavage is indicated.

**(Choice 1)** The use of laparoscopy in cases of blunt abdominal trauma is debatable and hemodynamic instability is an absolute contraindication to laparoscopy.

**(Choice 2)** Laparotomy is the appropriate next step in management if ultrasound demonstrates hemoperitoneum. Physicians may also skip straight to laparotomy in extreme cases, such as if the patient cannot be stabilized or has clear evidence of pneumoperitoneum or diaphragmatic rupture.

**(Choice 3)** Angiography is not a screening procedure for hemoperitoneum. However, if active hemorrhage is identified on a screening study and appears amenable to angiographic embolization, then this procedure may be utilized.

**(Choice 4)** X-ray films of the abdomen and pelvis would be useful for identifying pelvic, rib, or vertebral fractures. Any such fracture may raise concern for injury of abdominal viscera, but could not definitively identify such a condition.

**(Choice 5)** A CT scan of the chest would not be appropriate in this patient. His symptoms are more consistent with intraperitoneal bleeding than any thoracic etiology. Furthermore, a CT scan of the chest would cost valuable time in this unstable patient.

18. Question

1 points

**Category: Surgery**

A 28-year-old woman who is an Olympic cyclist is seen in the orthopedic clinic with complaints of numbness in her fingertips and pain in her left hand that occasionally radiates up her arm. She is often awakened by the symptoms. On physical examination, there is decreased sensation over the radial three and a half digits of the hand, and results of the Phalen's test are positive. Which of the following is the most likely diagnosis?

1. ☐ Carpal tunnel syndrome ☒
2. ☐ Pronator syndrome
3. ☐ Cubital tunnel syndrome
4. ☐ Ulnar nerve entrapment at the wrist
5. ☐ De Quervain disease

**INCORRECT** ☐

**The correct answer is 1.**

Carpal tunnel syndrome is caused by compression of the median nerve at the level of the wrist. The median nerve supplies sensation to the radial three and a half digits of the hand, as well as innervation of the thenar musculature. Symptoms include numbness and tingling in the fingertips and pain that can awaken the patient at night and that can travel proximally up the arm. Hyperextension of the hand or tapping over the nerve reproduces the findings. There can be sensory loss in the median nerve distribution and muscle weakness in the thumb.

**(Choice 2)** is a median nerve entrapment in the proximal forearm. It is a pure sensory syndrome. The cubital tunnel is a groove in the posteromedial aspect of the elbow that contains the ulnar nerve.

**(Choice 3)** is an ulnar nerve neuropathy.

**(Choice 4)** can occur at the wrist in Guyon's canal. In both of these conditions, patients may complain of numbness in the ulnar one and a half digits and have weakness of the intrinsic muscles.

**(Choice 5)** is usually caused by repetitive use of the thumb for some activity. Patients have pain and tenderness at the region of the radial styloid.

## 19. Question

1 points

### Category: Surgery

A 65-year-old man who recently moved to a new town consulted a family physician concerning a 2-week history of tiredness and weakness. Moreover, he recently noticed blood in his urine, pain on the right side of his back, fever, and shortness of breath, especially when walking further than 100 yards. In addition, he has a history of chronic headache, which had been attributed to high blood pressure by his previous physician, who had prescribed medication. However, he admitted his compliance was poor and he seldom remembered to take the prescribed medications regularly. He also provided a history of smoking one pack of cigarettes per week for more than 20 years and has had a longstanding "smoker's cough" with intermittent purulent expectoration. He did have some blood in his sputum a few months previously, and he has also noticed a loss of weight. He consumes alcohol in moderation, and although not diabetic himself, he has a family history of diabetes mellitus. Vital signs are blood pressure 170/100 mm Hg (repeatedly elevated), pulse 78/min regular, respirations 18/min, and temperature 101°F (38.3°C). He weighs 170 lb and is 6 feet tall. His oxygen saturation was observed to be 98% on room air. He has no pallor or cyanosis. Examination of his respiratory system reveals a midline trachea, absence of clubbing or cyanosis, and a few scattered crepitations in both lung fields, but no rales and rhonchi. His cardiovascular system appears to be normal, except for sinus tachycardia and hypertension. He has no peripheral pitting edema. Examination of the abdomen reveals a tender palpable mass in the right lower quadrant, which can be easily felt on ballottement. A complete blood count was normal; a chemistry panel revealed borderline high blood urea nitrogen (BUN) and creatinine levels but was otherwise unremarkable. Urinalysis revealed a few red and white blood cells per high-power field. The posteroanterior and lateral chest x-ray views revealed multiple well-differentiated masses of homogenous density in both lung fields, changes due to emphysema, and evidence suggesting chronic bronchitis. Which one of the following is the most likely diagnosis?

1. ☐ Renal tuberculosis
2. ☐ Transitional cell carcinoma of the bladder with metastasis to the lung
3. ☐ Primary lung cancer with metastasis to the kidney
4. ☐ Renal adenocarcinoma ☒
5. ☐ Acute pyelonephritis with metastatic abscesses in the lung

**INCORRECT** ☐

**The correct answer is 4.**

The patient has renal adenocarcinoma and hypertension secondary to ectopic production of renin by the tumor. Renal adenocarcinoma is the most common neoplasm of the kidney. It affects men twice as often as women, usually in the sixth to seventh decade of life. The neoplasm arises from renal tubular cells. Smoking is a predisposing factor. The tumor

affects the poles of the kidney, more commonly the upper. Hematuria is the most consistent sign (90%), sometimes associated with colic due to clot formation, followed by a dragging discomfort in the loin (45%), a palpable mass (30%), and fever (20%). "Cannonball" metastases to the lung occur in 60% of cases. Fever is not related to infection but results from chemicals released by the tumor. The tumors can ectopically secrete erythropoietin (leading to secondary polycythemia), parathormone-like peptide (leading to hypercalcemia), renin (leading to hypertension as noted in this case), gonadotropins (leading to feminization or masculinization), and/or cortisol (leading to Cushing syndrome). Serum levels of these hormones should be determined to confirm potentially elevated levels. A plain x-ray of the abdomen may show abnormal calcification in the tumor and distortion of the renal outline. An intravenous pyelogram (IVP) will reveal the mass, and the calyces may be stretched and distorted. Ultrasonography will show if the lesion is solid or cystic, and computed tomography (CT) with enhancement will demonstrate the extent of the lesion, including presence of hilar lymphadenopathy or involvement of the renal vein. Needle aspiration of the mass using CT for needle guidance is usually performed to obtain a histologic diagnosis. Angiograms are rarely done, as CT scans with contrast are adequate. Occasionally, an inferior venacavagram is indicated to establish extent of inferior vena caval involvement by the tumor. Radical nephrectomy is the treatment of choice if the tumor is confined to the kidney. The presence or absence of the renal vein or capsular invasion affects overall survival; 45% of patients without renal vein or capsular invasion achieve a 5-year survival, as opposed to 15%–30% of those with invasion. Adenocarcinoma of the kidney does not respond well to radiotherapy or conventional chemotherapy.

**(Choice 1)** Although the kidney is the most common extrapulmonary site for tuberculosis (TB), is incorrect; the homogeneous nodular masses in the lung go against this diagnosis. Furthermore, renal tuberculosis usually occurs between the ages of 20 and 40. Other properties of renal TB include that it is 50% more likely to occur in men than in women, urinary frequency is the most common and earliest symptom, and the urine remains negative for bacteria in the early stages. Dysuria sets in when the patient develops cystitis. Hematuria occurs in less than 5% of cases, and it is very uncommon to be able to palpate a renal mass in TB of the kidney.

**(Choice 2)** Transitional cell carcinomas of the bladder usually involve the renal pelvis and produce obstruction. They are not as common as renal cell adenocarcinoma.

**(Choice 3)** is not multifocal, and metastasis to the kidney is rare.

## 20. Question

1 points

### Category: Surgery

A 33-year-old female comes to the emergency room to be evaluated for frequent spontaneous nose bleeds. The CBC obtained reveals a **WBC 9500**, **HCT 37%**, and **PLT 19,000**. The patient is eventually diagnosed with ITP and given oral steroids for treatment, with follow-up appointments scheduled in oncology. Lacking a health care insurance provider, she returns to the emergency room 2 weeks after her discharge for increasing frequency and duration of nose bleeds. The patient has a platelet count of 500. What is the most appropriate next step in management of this patient?



1. ☐ Outpatient follow-up only
2. ☐ Prednisone, 1 mg/kg/day for 6 months
3. ☐ Splenectomy ☐
4. ☐ Technetium 99-m colloid liver spleen scan
5. ☐ Platelet transfusion until the count is normal

**INCORRECT** ☐

**The correct answer is 3.**

Idiopathic thrombocytopenic purpura (ITP) is an immune condition involving antiplatelet antibodies that is most commonly seen in children younger than the age of 6 years and in women in their thirties. In children, ITP is typically self-limiting, and strict bedrest with avoidance of contact sports is recommended. The spleen is the source of the IgG specific for platelets and the site of the phagocytosis of the coated platelets. Signs and symptoms of ITP include bleeding following minor trauma, easy bruising, mucosal bleeding, and petechiae. In adults, the initial treatment includes prednisone 1 mg/kg/day, but only 25% of patients sustain their platelet levels after steroid treatment alone. In those who do not achieve a sustained response to steroid therapy, IVIG is also given. When a patient fails to respond to these medical therapies, a splenectomy is indicated. Splenectomy is successful in 85% of cases. If ITP recurs after splenectomy, it may be due to the presence of an accessory spleen. Using a technetium-99 colloid scan or infusion of indium-111-labeled platelets, accessory spleens can be localized.

**(Choice 1)** Outpatient follow-up for a patient with severe thrombocytopenia is inappropriate and risks life-threatening complications such as spontaneous intracranial bleeding.

**(Choice 2)** Prednisone therapy is an option but 6 months of unmonitored therapy is not indicated.

**(Choice 4)** A radiolabeled study is used to localize remaining splenic tissue (accessory spleens) following splenectomy. It is not indicated prior to splenectomy.

**(Choice 5)** The spleen will continue to make antibodies to platelets, and the transfused platelets will eventually be destroyed.

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## 21. Question

**1 points**

### Category: Surgery

A 22-year-old football player comes to the physician because of difficulty in extending his right knee. This started one month ago after he twisted his knee while playing. There was mild swelling immediately; he took pain relievers which relieved both the pain and swelling. However, now the knee motion is limited and this is significantly restricting his physical activities. Physical examination



shows no swelling of the knee. While passively flexed and extended, a popping sensation is noted under the examiner's finger (which is placed at the right knee). Which of the following is the most appropriate next step in management?

1. ☐ Bone scan
2. ☐ Intraarticular steroid injection
3. ☐ Arthroscopy ☐
4. ☐ Active exercise
5. ☐ Rest and NSAIDs

**INCORRECT** ☐

**The correct answer is 3.**

This patient presents with symptoms and signs suggestive of meniscal injury. The episode of injury occurred one month ago, when acute pain and swelling were present. The current symptoms suggest 'locking', a phenomenon that is due to impaired extension of the knee. In addition to the patient's history, a positive McMurray sign is present (popping sound on passive flexion/extension of the joint), which is specific for meniscal injury. The mechanical symptoms have persisted for one month after the injury, and have impaired the activities of the patient; therefore, further evaluation is necessary. It is reasonable to do an arthroscopy or MRI to confirm the diagnosis, and evaluate the extent of the injury. Surgery (arthroscopic or open) is usually necessary to correct the problem.

**(Choice 1)** A bone scan will not be informative in this case.

**(Choice 2)** Intraarticular steroid injections can be used in patients with secondary meniscal injury due to degenerative joint disease.

**(Choice 5)** Rest and NSAIDs are used as an initial conservative therapy for acute meniscal injury, but have no value in this case.

**(Choice 4)** Active exercise can be employed as part of a rehabilitation program.

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## 22. Question

**1 points**

### Category: Surgery

A 62-year-old woman presents to her primary care physician with a cough. She also complains of hemoptysis. Social history reveals a 55-pack-a-year history of smoking. She is a recovering alcoholic. Physical examination reveals bilateral wheezes. Cardiac, pulmonary, and abdominal examinations are unremarkable. Laboratory values reveal serum calcium of 13 mg/dl. Serum protein electrophoresis shows no abnormal spikes. What is the most likely diagnosis?

1. ☐ Goodpasture's syndrome
2. ☐ Myeloma
3. ☐ Renal adenoma
4. ☐ Small-cell carcinoma of the lung
5. ☐ Squamous cell carcinoma of the lung ☐

**INCORRECT** ☐

**The correct answer is 5.**

The combination of cough, hemoptysis, wheezing, and smoking history suggests the diagnosis of lung cancer. Of the two lung cancers listed, squamous cell carcinoma is the one that may produce parathyroid hormone (PTH) related peptide protein. PTH receptor leads to hypercalcemia. Small-cell carcinomas commonly produce antidiuretic hormone or adrenocorticotropin hormone. In a patient with Goodpasture, hemoptysis may present before hematuria, but because of the other symptoms, squamous cell carcinoma is the better choice. Renal cell carcinoma, not renal adenoma, may produce ectopic PTH related protein, and smokers do have an increased risk, but these patients present with hematuria, a palpable mass, flank pain, and a fever. The lack of an immunoglobulin G or A spike on serum protein electrophoresis should rule out multiple myeloma.

## 23. Question

1 points

### Category: Surgery

A 19-year-old college student is driving under the influence of alcohol, despite recommendations from friends not to drive. She is struck by another driver. The force of impact causes her to strike the temporal area of her skull against the window. She develops a mild headache but does not lose consciousness. Several hours later, she develops a severe headache with nausea and vomiting. Which is the most likely diagnosis?

1. ☐ Bacterial infection
2. ☐ Berry aneurysm
3. ☐ Epidural hematoma ☐
4. ☐ Subarachnoid hematoma
5. ☐ Subdural hemorrhage

**INCORRECT** ☐

**The correct answer is 3.**

Epidural hematoma results from hemorrhage into the potential space between the dura and the skull. The hemorrhage most likely results from rupture to a meningeal artery, which travels within this plane; the middle meningeal artery, which branches off the maxillary artery in the temporal area, is most common. Normally, the patient experiences a lucid interval, defined as an asymptomatic period of a few hours after the trauma. A Berry aneurysm results from a defect in the media of arteries and is usually located at bifurcation sites. Berry aneurysms are most commonly found in the circle of Willis. The source of bleeding due to subdural hematoma is from bridging veins; these often occur in older adults as a result of minor trauma, and symptoms usually occur slowly days to weeks. Bacterial meningitis diagnosis is confirmed with lumbar puncture and demonstrates increased neutrophils/protein and decreased glucose in the cerebrospinal fluid.

## 24. Question

**1 points**

**Category: Surgery**

A 23-year-old male is brought to the emergency department following a motor vehicle accident (MVA) where he was the unrestrained driver. The patient was found unresponsive at the scene and was intubated by paramedics. He receives 2.5L of normal saline over the 20 minutes before he reaches the ED. His blood pressure there is 70/30 mmHg and his heart rate is 120/min. On physical examination, he responds to strong vocal and tactile stimuli by opening his eyes. His pupils are equal and reactive to light. There are multiple bruises over the anterior chest and upper abdomen. His neck veins are flat, trachea is midline and extremities are cold. Cardiac monitoring shows sinus tachycardia. Which of the following is the most likely cause of this patient's current condition?

1. ☐ Impaired myocardial contractility
2. ☐ Ventricular filling restriction
3. ☒ Loss of intravascular volume ☐
4. ☐ Air embolism
5. ☐ Loss of vascular tone

**INCORRECT** ☐

**The correct answer is 3.**

This patient has suffered blunt trauma and is now in shock as evidenced by his physical examination. Shock can be broadly defined as any state that causes perfusion inadequate to

meet the oxygen and nutrient demands of the tissues. In trauma or postsurgical patients, shock is presumed secondary to hemorrhage until proven otherwise. This patient has physical examination findings consistent with shock including hypotension, mental status change, and cool extremities. His trauma history, flat neck veins and sinus tachycardia implicate hypovolemia/ hemorrhage as the cause. The following table highlights the changes expected in progressively more severe classes of hemorrhagic shock.

Hemorrhage Classification	Class I	Class II	Class III	Class IV
Blood Loss (cc)	1000	1000-1500	1500-2000	>2000
Blood Loss %	<20	20-30	30-40	>40
Systolic Blood Pressure	Compensated	Orthostatic	Marked decrease	Profound decrease
Heart rate	<100	>100	>120	>140
Respiratory Rate	14-20	20-30	30-40	>35
Urine output cc/h	>30	20-30	5-20	Anuria
CNS status	Normal / Anxious	agitated	Confused	Confused / Obtunded
Capillary refill	Normal	Slight delay / Cool	Significant delay / Cool	Significant delay / Cold

**(Choice 1)** Cardiogenic shock occurs when the cardiac output is unable to meet the tissue's oxygen demands. Decreased cardiac output would cause elevated venous filling pressures and jugular venous distention.

**(Choice 2)** Restricted ventricular filling, for example due to traumatic cardiac tamponade, could cause cardiogenic shock in a trauma. Elevated venous filling pressures and jugular venous distention would be expected.

**(Choice 4)** Blunt trauma with pulmonary injury can produce communications between the airways and blood vessels resulting air emboli, especially if positive pressure mechanical ventilation is superimposed. Patients with air embolism typically experience focal neurologic defects, hemoptysis and circulatory arrest.

**(Choice 5)** Loss of vascular tone occurs in septic shock and neurogenic shock. These forms of shock would be less likely to cause flattened neck veins and cool extremities and should respond positively to a 2 liter IV fluid bolus.

25. Question

1 points

**Category: Surgery**

A 53-year-old male presents to the emergency room complaining of chest pain localized to the left chest wall and following a linear pattern along the fifth intercostal space. His past medical history is significant for polycystic kidney disease and hypertension. His current medications are metoprolol and amlodipine. He has a ten pack-year smoking history but quit 14 years ago. He consumes alcohol occasionally. His blood pressure is 160/90 mmHg and his heart rate is 90/min. Physical examination is noncontributory. His laboratory findings are as follows:

**Sodium:** 142 mEq/L

**Potassium:** 4.2 mEq/L

**Hemoglobin:** 9.5 mg/dl

**WBC:** 10,000/mm<sup>3</sup>

**Creatinine:** 1.9 mg/dl

**BUN:** 28 mg/dl

Chest x-ray reveals a solitary round lesion in the left upper lung field that measures 2 cm in diameter. It does not abut the pleura. Which of the following is the best next step in managing this patient?

1. ☐ Pulmonary function testing
2. ☐ CT scan of the chest ☒
3. ☐ Percutaneous biopsy of the lesion
4. ☐ Bronchoscopy
5. ☐ Repeated chest x-ray in 2 months

**INCORRECT** ☐

**The correct answer is 2.**

A solitary pulmonary nodule (SPN) is defined as a discrete lesion less than 3 cm in diameter incidentally discovered on chest x-ray. By definition, such nodules are surrounded completely by lung parenchyma and do not contact the pleura, hilum or mediastinum. Additionally there must not be any associated pleural effusion, adenopathy or atelectasis. The main goal of following SPNs is early detection of malignancies. Demographic data help to determine the patient's risk; specifically, risk increases with age and smoking history. Radiographic studies

are the best tools for monitoring SPNs. In considering the likelihood of malignancy, radiologists consider the lesion doubling time. Lesions that enlarge very slowly (take longer than 1 .5 years to double) are typically benign, and those that double very rapidly (less than 30 days) are frequently infectious. The best radiographic test for making a determination of malignancy is high-resolution CT scanning. Factors seen on CT scanning that are associated with malignancy include increasing size, irregular or spiculated margins, stippled or irregular calcifications, and cavitation with thickened walls.

**(Choice 1)** Pulmonary function testing will not give any additional information regarding the biologic behavior of the mass in question. PFTs are often obtained as part of the routine follow-up of COPD patients, or in lung cancer patients being evaluated for surgical fitness.

**(Choice 3)** If the patient's history and lesion's radiographic appearance leave the question of possible malignancy in doubt, biopsy and culture may be useful. Biopsy may be obtained percutaneously or by video assisted thoracoscopic surgery (VATS).

**(Choice 4)** Bronchoscopy can be used to biopsy accessible lesions as well, but in general percutaneous biopsies and VATS carry a superior diagnostic yield.

**(Choice 5)** Chest x-ray monitoring at 3 months, 6 months, and then annually for 2 years is recommended for patients with incidentally discovered SPNs considered at very low risk for malignancy based on demographic and radiographic data.

## 26. Question

1 points

### Category: Surgery

A 28-year-old woman presents to her doctor's office with a painless lump in the neck. She has a 10-year history of smoking cigarettes, and consumes three to four cigarettes per day. Physical examination reveals a nontender, firm, mobile lymph node in the right mid-cervical region. An excision biopsy of the node was carried out, and the specimen revealed well differentiated, branching structures with blue staining concretions. Which of the following is the most likely source of this lesion?

1. ☐ Vocal cord
2. ☐ Parotid gland
3. ☐ Thyroid gland ☐
4. ☐ Lung
5. ☐ Breast

INCORRECT ☐

**The correct answer is 3.**

The patient has a papillary adenocarcinoma of the thyroid that has metastasized to the cervical lymph nodes. These are the most common thyroid cancers and are usually found in women between 20 and 60 years of age. They are papillary tumors that are often mixed with follicles. Psammoma bodies (blue-staining calcium concretions) are an excellent marker for the cancer. Most patients initially present with palpable lymphadenopathy in the neck, which represents nodal metastasis via permeation of the lymphatics. They can produce a miliary pattern of metastasis to lung resembling miliary tuberculosis.

**(Choice 1)** Carcinomas of the larynx may involve the vocal cord; approximately 70% of these are found in the glottic area, 20% are found in the supraglottic region, and the remaining 10% are located in the subglottic or hypopharynx regions. Laryngeal carcinomas are usually squamous-celled. Those involving the glottic fold (i.e., true vocal cords) usually arise in the anterior half of one of the true vocal cords. They are usually papillary and rarely ulcerative. Due to the paucity of lymphatics in this area, the tumor tends to be locally malignant for a long time, and hence has a relatively good outcome. Often it is symptom free until the fifth or sixth decade of life; although cigarette smoking is a definite contributory factor, the greatest risk factor is consumption of alcohol. The most frequent and initial symptom is a change in voice a huskiness that becomes progressive. Thereafter, the patient can barely whisper, until finally, aphonia develops as the vocal cord becomes fixed. Although supraglottic tumors (which involve the false cords, laryngeal ventricles, or the base of the epiglottis) metastasize early to the cervical lymph nodes, those that involve the glottis remain localized for a long time. Subglottic carcinomas occur beneath the vocal folds, and the patient presents with difficulty in breathing. Metastasis occurs to the paratracheal and lower deep cervical nodes, and even the thyroid gland. Laryngeal carcinoma located in the hypopharynx is associated with dysphagia and pain on swallowing.

**(Choice 2)** The most common malignant parotid gland tumor is mucoepidermoid carcinoma.

**(Choice 4)** The most common primary lung cancer is an adenocarcinoma with the formation of glandular structures.

**(Choice 5)** The most common breast cancer is an infiltrating ductal carcinoma. Papillary cancers are very uncommon.

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27. Question

1 points

**Category: Surgery**

A 42-year-old woman drops a hot iron on her lap while doing the laundry. She comes in with the shape of the iron clearly delineated on her upper thigh. The area is white, dry, leathery, and anesthetic. Which of the following is the most appropriate next step in management?

- 1. ☐ Application of mafenide acetate
- 2. ☐ Application of silver sulfadiazine
- 3. ☐ Use of triple antibiotic ointment



- 4. ☐ Repeated debridement and wet to dry dressings
- 5. ☐ Immediate excision and grafting ☐

**INCORRECT** ☐

**The correct answer is 5.**

At one time, all full thickness burns were allowed to heal by granulation over a period of 2 or 3 weeks, before skin grafting was done. The area was kept free of bacteria by the use of topical agents, such as the ones listed in the alternate answers. The process was expensive, painful, time-consuming, and prone to complications. The current preference is to do immediate excision and grafting of burned areas that appear to be full thickness, if they are not very extensive. This one is a perfect example.

**(Choice 1)** If the extent of the burn precludes early excision and grafting, mafenide acetate is used in areas where deep penetration is needed. Otherwise it is not a first choice because it hurts and can produce acidosis.

**(Choice 2)** Silver sulfadiazine is the “workhorse” of burn wound antibacterial therapy, but as pointed out, it would be a perfect choice only if we had to go the slow route of preparing the area for delayed skin grafts.

**(Choice 3)** Triple antibiotic ointment is preferred for burns around the eyes, as the other two topical agents are very irritating.

**(Choice 4)** Debridement is often indicated in the long-term preparation of an area to be grafted, but wet-to-dry dressings would be less effective than antibacterial agents. In any event, we want immediate excision and grafting for this patient.

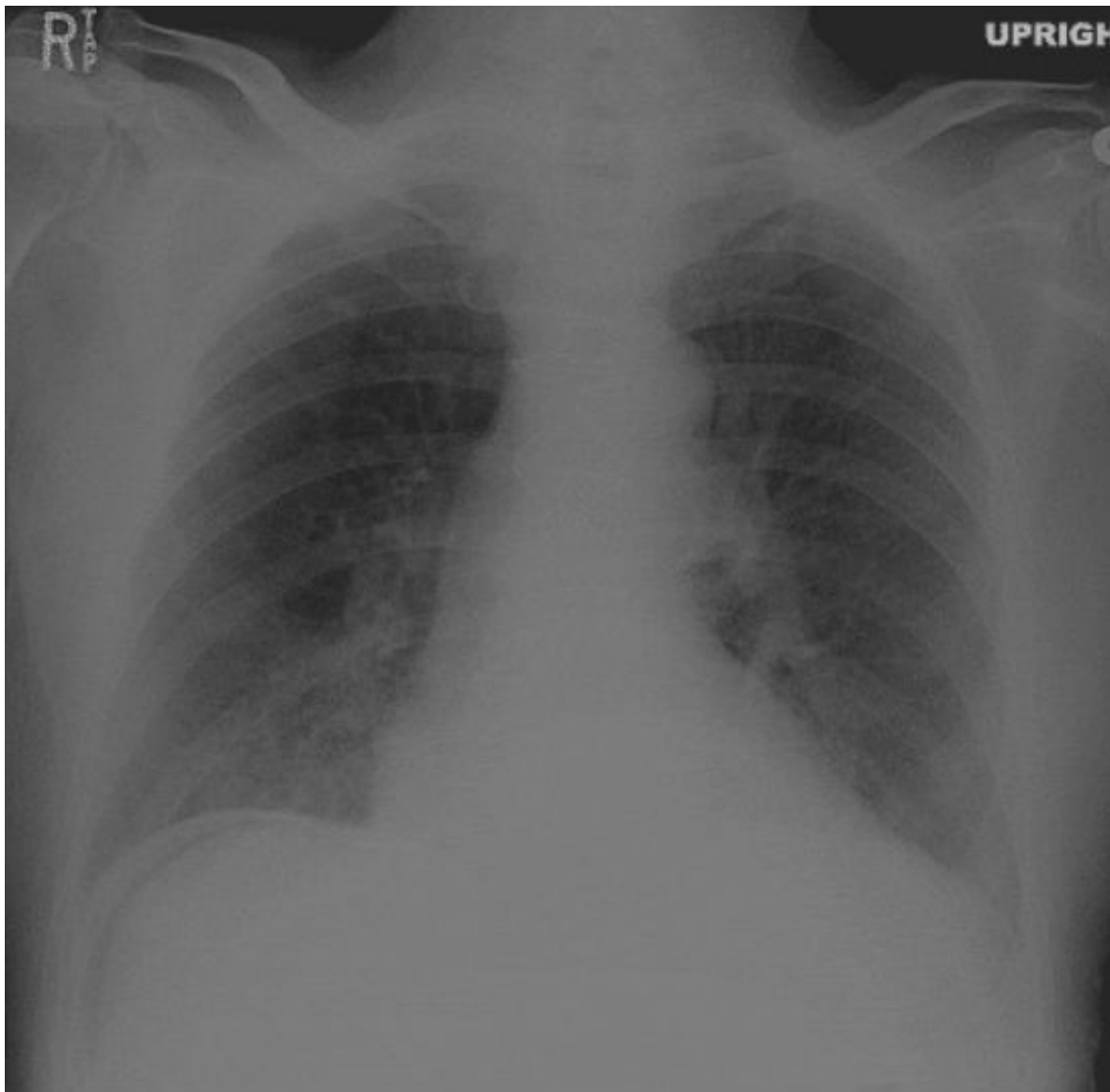
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## 28. Question

**1 points**

### Category: Surgery

A 53-year-old male comes to the emergency department complaining of sudden onset intense, stabbing epigastric pain. He also vomited once and a dull, aching pain then spread through his entire abdomen. He has had nonspecific epigastric pain for several months and saw a physician one month ago. He also has a history of constipation, type II diabetes mellitus and hyperlipidemia. He has smoked one and a half packs of cigarettes daily for 26 years. He drinks 4 oz of alcohol daily. His temperature is 38.3 °C (100.4 °F), blood pressure is 160/95 mm Hg, pulse is 100/min and respirations are 26/min. The entire abdomen is tender to palpation with rebound, but there is no guarding. No masses are palpable, and Murphy's sign elicits mild pain. Rectal examination shows no abnormalities. Abdominal ultrasound performed 2 weeks ago showed stones in the gall bladder. Upright chest x-ray is shown below:



(./Surgery -

AMC Question Bank\_files/lmae-Block5-10-33-Q.png)

Which of the following is the most likely diagnosis in this patient?

1. ☐ Acute cholecystitis
2. ☐ Acute alcoholic pancreatitis
3. ☐ Acute gallstone pancreatitis
4. ☐ Perforated peptic ulcer ☒
5. ☐ Perforated diverticulitis
6. ☐ Biliary colic

**INCORRECT** ☐

**The correct answer is 4.**

The above upright radiograph shows free air under the diaphragm, a sign of perforation of an abdominal viscus. His presentation complaining of “sudden” onset abdominal pain also indicated perforation. The patient’s history of chronic epigastric pain is most likely due to

peptic ulcer disease, and given this, the diagnosis of perforated peptic ulcer is most likely. The patient's diffuse abdominal pain is the result of a chemical peritonitis due to the release of gastric secretions into the peritoneum.

**(Choices 1 & 6)** Cholecystitis and biliary colic would not cause free air under the diaphragm though emphysematous cholecystitis may be associated with pneumobilia. Cholecystitis is associated with a positive Murphy's sign, but this physical exam maneuver is not specific. Additionally, the presence of gallstones on ultrasound does not necessarily indicate cholecystitis or choledocholithiasis, as asymptomatic gallstones are very common.

**(Choices 2 & 3)** Pancreatitis would not cause free air under the diaphragm. Additionally, pancreatitis is classically associated with dull, "boring" epigastric pain that radiates to the midback.

**(Choice 5)** Any perforated viscus can give free air. Diverticulitis usually starts with left lower quadrant pain and usually does not have the dramatic presentation with sudden abdominal pain.

## 29. Question

1 points

### Category: Surgery

A 62-year-old chronic smoker has an episode of hemoptysis. Other than a barrel chest suggestive of chronic obstructive pulmonary disease, his physical examination is unremarkable. A chest x-ray film shows a central hilar mass. Bronchoscopy and biopsy establish a diagnosis of squamous cell carcinoma of the lung. Pulmonary function studies show that he has a forced expiratory volume at 1 second (FEV1) of 2200 mL, and a ventilation perfusion scan shows that 30% of his pulmonary function comes from the affected lung. Which of the following is the most appropriate next step in management?

1. ☐ CT scan of the chest and upper abdomen ☐
2. ☐ Radiation and chemotherapy
3. ☐ Random sampling of supraclavicular nodes
4. ☐ Lobectomy
5. ☐ Pneumonectomy

**INCORRECT** ☐

**The correct answer is 1.**

Pneumonectomy is the preferred treatment for centrally located non-small cell cancers of the lung. The patient's pulmonary function studies (prompted by the suggestion of chronic obstructive pulmonary disease) show that he can tolerate the removal of one third of his current lung capacity, as it would leave him with more than 800 mL forced expiratory volume

at 1 second (FEV1 ). However, there is no point in undertaking surgical therapy unless cure is possible, which would not be the case if he has liver metastasis, metastasis on the other lung, or involved mediastinal nodes at or above the carina. CT scan is the first step to answer those questions, before the pneumonectomy is considered.

**(Choice 2)** Radiation and chemotherapy would have been the chosen palliative therapy if metastatic spread had contraindicated surgery. It would also have been the correct answer if the tumor had been small cell, rather than squamous cell, carcinoma.

**(Choice 3)** The supraclavicular nodes can be involved in lung cancer, but they are not the first level. Thus, a negative biopsy would not have given the green light for surgery. If a CT scan does not give a satisfactory answer as to the status of mediastinal nodes, a cervical mediastinal exploration would be the procedure of choice to sample carinal nodes.

**(Choice 4)** Lobectomy is not suitable for central lesions, but it might have been the operation of choice for a peripheral tumor.

**(Choice 5)** Pneumonectomy is indeed our goal, but one would not do it without first making sure that extensive metastases are not present.

### 30. Question

1 points

#### Category: Surgery

A 22-year-old man is stabbed in the right chest with a 5-cm-long knife blade. On arrival at the emergency department, he is wide awake and alert. He is speaking with a normal tone of voice but complaining of shortness of breath. The right hemithorax is hyperresonant to percussion and has no breath sounds; the rest of the initial survey is negative. His blood pressure is 110/75 mm Hg, pulse is 86/min, and venous pressure is 3 cm H<sub>2</sub>O. Pulse oximetry shows a saturation of 85%. Which of the following is the most appropriate next step in patient care?

1. ☐ Infusion of 2 L Ringer's lactate
2. ☐ Securing an airway by orotracheal intubation
3. ☐ Immediate insertion of a needle into the right pleural space
4. ☒ Chest x-ray and insertion of a chest tube
5. ☐ Sonographically guided evacuation of the pericardial sac

**INCORRECT** ☐

**The correct answer is 4.**

A penetrating wound to the chest will produce either a pneumothorax, a hemothorax, or both. The absence of breath sounds confirms that one of those has occurred, and the

hyperresonance to percussion indicates that air is present. The patient's good vital signs indicate that there is time to do the proper diagnostic study (chest x-ray). The appropriate treatment for a pneumothorax is placement of a chest tube.

**(Choice 1)** would have been appropriate if the findings had suggested hemothorax (as evidenced by dullness to percussion), and he had been bleeding (as evidenced by low blood pressure and a fast pulse).

**(Choice 2)** A patient who is fully awake and alert, and who is speaking in a normal tone of voice, has an airway and can maintain it.

**(Choice 3)** Immediate insertion of a needle into the right pleural space would be appropriate management for a tension pneumothorax. If the patient had a tension pneumothorax, he would have been in shock and severe respiratory distress, and the mediastinum would have been shifted (evidenced by tracheal deviation).

**(Choice 5)** would be appropriate management for pericardial tamponade, which is not present in this patient. If the patient had developed tamponade, he would have been in shock, with a high central venous pressure (or distended veins).

### 31. Question

1 points

#### Category: Surgery

A 15-year-old female presents to the emergency department with a 2-day history of lower abdominal pain. The patient states that the pain began in the right lower quadrant, but has progressively worsened over the last 24 hours, becoming quite intense. She denies having a fever but complains of nausea, vomiting, and a poor appetite. Her last menstrual period was 6 weeks ago, and she reports being sexually active only twice. Currently she takes no medications and denies allergies. On physical exam, she appears acutely ill and has diffuse tenderness in the lower abdomen, with the right side being worse than the left, with no peritoneal signs. Rectal and pelvic exams are normal. A serum  $\beta$ -hCG level is 5500 mIU/mL. What initial test is most appropriate in the work-up of this patient?

1. ☐ CT scan of abdomen and pelvis
2. ☐ Pelvic ultrasound ☐
3. ☐ Abdominal series
4. ☐ Culdocentesis
5. ☐ Diagnostic laparoscopy

INCORRECT ☐

**The correct answer is 2.**

A pelvic ultrasound is a safe, accurate, and useful technique in pregnant patients suspected of having an ectopic pregnancy. This procedure can identify an intrauterine pregnancy with considerable accuracy, effectively ruling out ectopic pregnancy. It should be the first imaging study performed.

**(Choice 1)** Although a CT scan may ultimately be needed, it is not the test of choice in a female with an early pregnancy because of the risks associated with radiation exposure.

**(Choice 3)** An abdominal series is a nonspecific test that would not be helpful in ruling out an ectopic pregnancy and would expose an early pregnancy to unnecessary radiation.

**(Choice 4)** Culdocentesis is a diagnostic procedure that was more commonly used prior to the advent of ultrasonography. It entails placing an 18-gauge needle in the cul-de-sac of Douglas and aspirating the contents. A negative culdocentesis cannot definitively confirm or rule out an ectopic pregnancy.

**(Choice 5)** A diagnostic laparoscopy is a reasonable option, but only in cases in which other noninvasive modalities are unable to confirm a diagnosis.

## 32. Question

1 points

### Category: Surgery

While working on-site at a factory doing physical examinations for workers, a physician is suddenly called to help a worker who amputated his finger. Which of the following is the most appropriate next step in management in this situation?

1. ☐ Place the amputated finger in a plastic bag with water and bring it along with the patient to the emergency department
2. ☐ Place the amputated finger in a plastic bag with alcohol; place the bag on a bed of ice and bring it along with the patient to the emergency department
3. ☐ Place the amputated finger in saline moistened gauze in a plastic bag; place the bag on a bed of ice and bring it along with the patient to the emergency department ☐
4. ☐ Place the amputated finger in antiseptic solution and bring it along with the patient to the emergency department
5. ☐ Place the amputated finger on a bed of ice and bring it along with the patient to the emergency department

**INCORRECT** ☐

**The correct answer is 3.**

All patients suffering traumatic amputations should be treated as candidates for reimplantation while in the field. As such, their amputated limb or digit should be wrapped in



sterile gauze, moistened with sterile saline and placed in a plastic bag. The bag should be then placed on ice and transported with the patient to the nearest emergency department. The amputated part should not be allowed to freeze. Packaging of the amputated part in this manner prolongs the viability of the part for up to 24 hours. Younger patients suffering sharp amputations with no crush injury or avulsion are the best candidates for amputation reimplantation.

**(Choice 1)** The amputated part should not be immersed in water as this may make digital vessel repair more difficult.

**(Choices 2 & 4)** The amputated part should not be placed in antiseptic solution or alcohol as chemical injury may occur. The patient will be appropriately treated with antibiotics and the amputated part irrigated and cleansed before reimplantation is attempted.

**(Choice 5)** The amputated part should not be placed directly on ice because this could result in frostbite injury to the amputated tissue and loss of viability.

### 33. Question

1 points

#### Category: Surgery

A 37-year-old male is brought to the emergency department immediately after being smashed in a hydraulic press at a local factory. He is alert and oriented. Despite 10mg of IV morphine given by the paramedics, he is crying with pain. His blood pressure is 110/70 mm Hg, pulse is 110/min, and respirations are 18/min. Apparently, his left humeral shaft is fractured and the left arm is severely deformed being bent medially 90 degrees. Left radial artery pulse sensation and muscle strength in the left forearm are decreased compared to the right side. His right leg is shortened and externally rotated. Deformity of the right thigh is noted. Pedal pulses are symmetric. He has pain in the left anterior chest on antero-posterior sternal compression, but breath sounds are normal. Physical examination otherwise shows no abnormalities. The paramedics have placed 2 peripheral intravenous lines and immobilized the fractured limbs. Which of the following is the most appropriate next step in management?

1. ☐ X-ray of the left arm, right leg and chest
2. ☐ Repeat 10 mg morphine
3. ☐ Induction of general anesthesia for operative reduction of the fractures
4. ☐ Gentle traction of the left forearm to attempt alignment of the fragments of the humerus ☐
5. ☐ Gentle traction of the right leg to attempt alignment of the fragments of the femur

INCORRECT ☐

**The correct answer is 4.**

Neurologic deficit is not uncommon after humeral shaft fractures. Radial nerve injuries are most common. Most of them resolve spontaneously after a few months. Compression of the brachial artery could cause pulse asymmetry, not necessarily indicating serious vascular injury. An attempt to align the humerus should be made first. If successful it takes 30sec and will, to some extent, restore the normal anatomy of the limb. It would decrease the patient's pain and discomfort. Then, the pulses must be checked again. Failure to perform the alignment easily indicates that muscles, nerves, or vessels are entrapped in the fracture site. In such a case, operation is required.

**(Choices 1,2,3 & 5)** are correct, but choice 4 should be attempted first.

34. Question

1 points

**Category: Surgery**

A 65-year-old man with cervical spondylosis secondary to degenerative changes in the cervical spine was admitted after being involved in a motor vehicle accident. He regained consciousness after 5 minutes. After regaining consciousness, he had complete weakness in both upper extremities but was able to move his lower extremities. Vital signs are stable. Plain x-ray films of the cervical spine show no abnormalities except those consistent with mild degenerative changes. Which of the following is the most likely diagnosis?

1. ☐ Brown-Sequard syndrome
2. ☐ Central cord syndrome ☒
3. ☐ Cerebral contusion
4. ☐ Posterior spinal cord syndrome
5. ☐ Anterior spinal cord syndrome

**INCORRECT** ☐

**The correct answer is 2.**

The central cord syndrome classically occurs with hyperextension injuries in elderly patients with degenerative changes in the cervical spine. Such a traumatic injury causes selective damage to the central portion of the anterior spinal cord, specifically the central portions of the corticospinal tracts and the decussating fibers of the lateral spinothalamic tract. Central cord syndrome is characterized by weakness that is more pronounced in the upper extremities than in the lower extremities. This unique motor deficit occurs because the motor fibers serving the arms are nearer to the central part of the corticospinal tract. Rarely, a patient may also have a selective loss of pain and temperature sensation in the arms due to damage to the spinothalamic tract.

**(Choice 1)** Brown-Sequard syndrome (hemisection of the cord) is classically associated with ipsilateral loss of vibration and proprioceptive sensation as well as ipsilateral spastic paresis.

**(Choice 3)** Cerebral contusion usually causes an altered level of consciousness (due to edema) with the risk of seizure; focal neurologic signs may be present.

**(Choice 4)** Posterior cord syndrome is associated with bilateral loss of vibratory and proprioceptive sensation.

**(Choice 5)** The anterior cord syndrome should be suspected when there is bilateral spastic motor paresis distal to the lesion. It usually occurs secondary to occlusion of the vertebral artery.

### 35. Question

1 points

#### Category: Surgery

A 24-year-old woman comes to the physician because of a one-week history of increasing pain in the right leg. She is an active dancer and practices 4-5 hours a day. One week ago, she felt a dull aching pain in the right middle leg; the pain has been increasing since and is particularly bad when she dances. The pain is interfering with her dancing sessions. She is afebrile and her other vital signs are within normal limits. Examination shows point tenderness over the midpoint of the right leg; there are no abnormalities of the skin overlying the tender point. Knee and ankle examinations show no abnormalities. An x-ray of the lower leg shows no abnormalities. ESR is within normal limits. Which of the following is the most likely cause of her pain?

1. ☐ Ligamentous tear
2. ☐ Stress fracture ☐
3. ☐ Bone infection
4. ☐ Nerve entrapment
5. ☐ Bone neoplasm

**INCORRECT** ☐

**The correct answer is 2.**

The patient described is most likely suffering a tibial stress fracture. The tibia is the most common bone in the body to be affected by stress fractures, and the patients affected by this condition are most commonly competitive athletes. A stress fracture can occur even in conditioned athletes after only four to six weeks of intense training. Patients who participate in running sports classically obtain stress fractures in the distal third of the tibia on the posteromedial border while patients involved in jumping sports, such as dancing, classically obtain stress fractures in the middle third of the tibia on the anterior side of the bone. Patients

typically complain of pain with activity that improves with rest. If activity is continued, the pain may persist during rest. Point tenderness to palpation over the fracture is present on exam. X-rays are usually normal, but they may reveal periosteal reaction in the site of the fracture. The injury is best defined radiographically using CT or bone scan.

**(Choice 1)** Ligamentous tear is unlikely in the midpoint of the leg as there are no ligaments in this location other than the interosseus membrane.

**(Choice 3)** Bone infection is unlikely in this patient because the ESR is not elevated.

**(Choice 4)** Nerve entrapment typically presents with radiating pain and is not typically reproducible with palpation. This patient has localized pain and point tenderness.

**(Choice 5)** Bone neoplasms typically present with pain and tenderness and may be complicated by pathologic fractures. Metastases to bone are more common than primary bone tumors and these typically affect the axial skeleton or proximal humerus and femur. Usually radiographic evidence of bone destruction or tumor is evident on x-ray in these cases.

### 36. Question

1 points

#### Category: Surgery

A 35-year-old woman is brought to the emergency department after being rescued from a burning home by firefighters. She is confused, agitated and tachypneic. Her temperature is 37 °C (98.6 °F), blood pressure is 100/60 mm Hg, pulse is 130/min and respirations are 24/min. Physical examination shows no burns and her skin color is normal. Auscultation shows normal bilateral air entry with scattered wheezes. Neurological examination shows no abnormalities except some confusion. Abdominal examination shows a soft abdomen; bowel sounds are present. Which of the following is the best immediate treatment for her acute confusional state?

1. ☐ Endotracheal intubation with 100% oxygen
2. ☐ Administration of 100 % oxygen with facemask ☐
3. ☐ Administration of 50% dextrose
4. ☐ Administration of thiamine
5. ☐ Administration of intravenous morphine

**INCORRECT** ☐

**The correct answer is 2.**

Acute carbon monoxide poisoning should be considered in all patients who are exposed to smoke, especially in a closed space. Carbon monoxide has over 200 times higher affinity for hemoglobin than does oxygen, and it impairs the delivery of oxygen to tissue by shifting the hemoglobin-oxygen dissociation curve to the left. Carbon monoxide toxicity affects the

organs with the highest demand for oxygen first, namely the brain and heart. This explains the early manifestations of carbon monoxide poisoning, which include confusion, agitation and somnolence. Chest pain or arrhythmias resulting from cardiac hypoxia may also occur. The treatment of carbon monoxide poisoning is administration of 100% oxygen via nonrebreather facemask and regular monitoring for at least four hours. 100% oxygen can decrease the half-life of carbon monoxide from three to four hours on room air to approximately one hour. Hyperbaric oxygen can be used in severe cases not responsive to facemask-administered oxygen.

**(Choice 1)** Endotracheal intubation is not required for administration of 100% oxygen. This patient is breathing spontaneously and is conscious, so intubation is not required.

**(Choices 3 & 4)** A bolus of 50% dextrose and intravenous thiamine is indicated in any unconscious patient as an emergency measure to assess for hypoglycemia. This patient is not unconscious and the etiology of her acute confusion is evident.

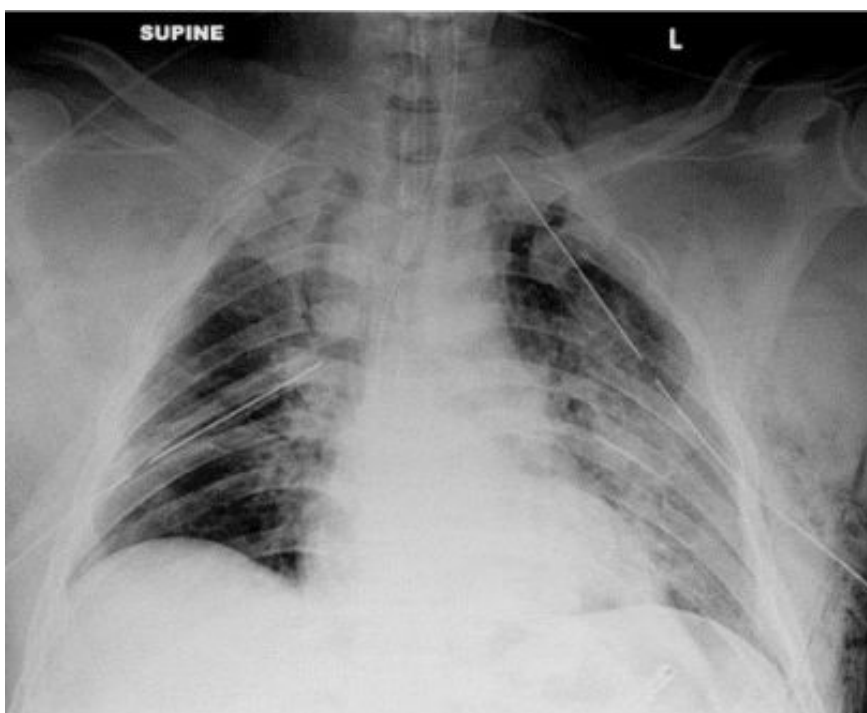
**(Choice 5)** Intravenous morphine in emergency setting is indicated as one component of the treatment for acute pulmonary edema. In this patient, morphine would be counterproductive because it would suppress her respiratory drive.

### 37. Question

1 points

#### Category: Surgery

A 22-year-old male involved in a motor vehicle accident undergoes active IV fluid resuscitation with 2L normal saline over 20 minutes. He seems to be in significant respiratory distress, with a respiratory rate of 40/min, and is subsequently intubated. His blood pressure is 90/50 mm Hg, and heart rate is 120/min. He is responsive to painful stimuli only. His chest X-ray findings are shown on the slide below.



Which of the following is the most likely cause of respiratory distress in this patient?

1. ☐ Massive hemothorax
2. ☐ Diaphragmatic tear
3. ☐ Flail chest ☐
4. ☐ Tension pneumothorax
5. ☐ Atelectasis

**INCORRECT** ☐

**The correct answer is 3.**

The patient described is suffering from a flail chest. Clues that support this diagnosis include the x-ray findings (i.e., multiple rib fractures and opacification of the left lung, which is likely the result of a pulmonary contusion), coupled with the patient's presentation (i.e., severe tachypnea and respiratory distress following major thoracic trauma). Classically, flail chest occurs following fractures of numerous contiguous ribs in two or more locations. Due to severe pain, patients with flail chest take shallow breaths and compensate for the resulting hypoxemia with hyperventilation. Trauma severe enough to cause flail chest also typically causes a significant pulmonary contusion, which is regarded as the primary reason for respiratory distress in patients with such an injury. On examination, the isolated thoracic wall segment may exhibit paradoxical inward motion on inspiration, and outward movement on expiration. Intubation with mechanical positive pressure ventilation is required in many patients with this injury, but pain control and supplemental oxygen are the most important early steps in management.

**(Choice 1)** A massive hemothorax, defined as a hemorrhage of at least 1500 cc of blood into a hemithorax, would cause hypotension, tachycardia and respiratory distress. X-ray typically shows an aerated lung surrounded by fluid.

**(Choice 2)** A large traumatic rupture of the diaphragm would be required to cause the degree of respiratory distress seen in this patient. On x-ray, this would show an abnormality of the diaphragmatic shadow and herniation of abdominal contents into the left pleural space. Additionally, the tip of the nasogastric tube is typically seen in the left hemithorax in diaphragmatic ruptures.

**(Choice 4)** Tension pneumothorax can cause respiratory distress, hypotension and tachycardia; however, the typical x-ray findings are tracheal and mediastinal displacement to the contralateral side, and excessive radiolucency of the affected side.

**(Choice 5)** Lobar atelectasis or complete collapse of an entire lung could compromise respiratory gas exchange; however, this patient's chest x-ray shows lung markings at much of the periphery of each thoracic cage, thus indicating that ventilation is occurring in all areas of both lungs.



**Category: Surgery**

A 44-year-old obese male is brought to the ER after a motor vehicle accident. His cervical spine is immobilized. He is alert and able to speak in complete sentences. He complains of abdominal pain. At the scene of the accident, his blood pressure is 90/60 mm Hg and pulse is 120/min. Lungs are clear to auscultation. Ecchymosis is present over the abdominal wall in distribution of the seat belt. Bowel sounds are decreased. Neck veins are collapsed. After receiving one liter of intravenous fluids, his blood pressure remains at 90/60 mm Hg. A focused assessment with sonography for trauma is inconclusive due to the poor image quality. Which of the following is the most appropriate next step in management of this patient?

1. ☐ CT scan of the abdomen
2. ☐ Plain X-ray films of the abdomen
3. ☐ Diagnostic peritoneal lavage ☐
4. ☐ Immediate laparotomy
5. ☐ X-ray of the chest

**INCORRECT** ☐

**The correct answer is 3.**

This patient's history of motor vehicle accident, ecchymosis over the abdominal wall in distribution of the seat belt and decreased bowel sounds is suspicious for blunt abdominal trauma. Furthermore, collapsed neck veins and hypotension indicate hemodynamic instability. In a hemodynamically unstable victim of blunt abdominal trauma, administration of intravenous fluids, followed by FAST (Focused Assessment with Sonography for Trauma), is the appropriate course of action. Ultrasound images, however, tend to be of low quality in patients with obesity. For any case in which ultrasound images are not definitive, diagnostic peritoneal lavage should be performed. In diagnostic peritoneal lavage, a catheter is inserted via an abdominal incision and fluid is aspirated for signs of bleeding. If either ultrasound or peritoneal lavage demonstrates hemoperitoneum, the patient should then undergo laparotomy and surgical repair.

**(Choice 1)** A CT scan of the abdomen is the appropriate assessment for hemodynamically stable victims of blunt abdominal trauma. In this patient with hemodynamic instability, a CT scan would not be appropriate.

**(Choice 2)** Plain x-ray films of the abdomen are of limited utility in assessment of blunt abdominal trauma and have low sensitivity for identifying sources of bleeding.

**(Choice 4)** If peritoneal lavage in this patient were to demonstrate hemoperitoneum, the patient would then undergo laparotomy. Physicians may skip straight to laparotomy in patients who cannot be stabilized or have clear evidence of pneumoperitoneum or diaphragmatic rupture.

**(Choice 5)** A chest x-ray is very useful for identifying free air in the abdomen. It would also help in identifying thoracic injury in the patient. However, it is not sensitive for detecting hemoperitoneum.

### 39. Question

1 points

#### Category: Surgery

A 34-year-old man is brought to the emergency department after being involved in a motor vehicle collision. He was the restrained front passenger. He has had epigastric pain since the accident. He is hemodynamically stable and has no obvious injury or other complaints. An x-ray of the abdomen shows retroperitoneal air. Which of the following is the most appropriate test to confirm the diagnosis?

1. ☐ CT scan of the abdomen without contrast
2. ☐ Diagnostic peritoneal lavage
3. ☐ Colonoscopy
4. ☐ CT scan of the abdomen with oral contrast ☒
5. ☐ Ultrasonogram of the abdomen

**INCORRECT** ☐

**The correct answer is 4.**

Duodenal injury may occur during blunt trauma when the duodenum is compressed between the spine and an external solid structure like a steering wheel or seat belt during high-speed decelerating trauma. The second part of the duodenum, being retroperitoneal and therefore the least mobile is the most commonly injured part of the duodenum in blunt abdominal trauma. Isolated duodenal injuries can be easily missed because the symptoms are subtle. Patients may complain of epigastric pain, nausea and vomiting. Peritoneal signs are usually not present because the rupture is contained within the retroperitoneum. Retroperitoneal air on abdominal x-ray is very suggestive. CT scan of the abdomen with oral contrast confirms the diagnosis of duodenal injury and will also disclose the presence of a concomitant duodenal hematoma.

**(Choices 1 & 5)** Noncontrast CT of the abdomen and ultrasound are not sensitive for duodenal injuries. An ultrasound, however, is very useful in determining injury to many other abdominal viscera and is routinely employed in the focused assessment with sonography for trauma (FAST) exam, which aids surgeons in determining if a patient requires an emergent exploratory laparotomy.

**(Choice 2)** DPL is not sensitive for duodenal injuries because the second part of the duodenum, the most commonly injured portion of the duodenum, is retroperitoneal. DPL has largely been replaced by the FAST exam in the assessment of abdominal trauma.

#### 40. Question

1 points

##### Category: Surgery

A 30-year-old woman comes to the physician 6 hours after falling on her outstretched right hand. She has pain and limitation of movement in her wrist, but denies sensations of tingling or numbness. The right wrist is mildly swollen, and its range of passive motion is limited compared with the left side. Palpation elicits maximal tenderness in the area of the anatomic snuffbox, between the tendons of the extensor pollicis longus and abductor pollicis muscles. Ulnar and radial pulses are normal, and Tinel's and Phalen's tests are negative. Further examination rules out signs of nerve or vascular damage. Plain x-ray films performed in the anterior/posterior, lateral, and oblique views fail to show any evidence of fractures. At this time, which of the following is the most appropriate next step in management?

1. ☐ Bone scanning
2. ☐ MRI examination of the wrist
3. ☐ Treatment for wrist sprain
4. ☐ Treatment for scaphoid fracture ☐

**INCORRECT** ☐

**The correct answer is 4.**

The mechanism of injury and symptomatology are consistent with fracture of the scaphoid bone. The most important clue to diagnosis is the presence of pain on pressure in the "anatomic snuffbox." Plain x-ray films in the first 24-48 hours usually fail to reveal evidence of fractures, and the patient may be mistakenly diagnosed as having a sprain. In the presence of the characteristic history and findings on physical examination, appropriate treatment for presumptive scaphoid fracture should be instituted, until proven otherwise.

**(Choice 1)** may be performed to confirm the presence of scaphoid fracture. It is more sensitive than plain x-rays, but it frequently gives false negative results in the first 48 hours following trauma.

**(Choice 2)** MRI examination of the wrist, as well as CT scans, can be performed if there is a need for prompt confirmation of the clinical suspicion of scaphoid fractures. However, these radiologic investigations are not cost-effective.

**(Choice 3)** Treatment for wrist sprain is the most common mistake when dealing with scaphoid fractures, especially because plain x-ray films are often negative in the first day or two after the fracture occurs. Missed scaphoid fracture is among the top 10 reasons formal practice suits.

41. Question

1 points

**Category: Surgery**

While riding his bicycle, a 9-year-old boy loses control and falls. During the process, his abdomen strikes the handlebar. His parents bring him to the emergency department because he has vague midabdominal pain and some bruising of the anterior abdominal wall. His vital signs are stable, and he has no other visible injuries. Which of the following is the most likely diagnosis?

1. ☐ Ruptured spleen
2. ☐ Ruptured liver
3. ☐ Ruptured pancreas
4. ☐ Hematoma in the rectus muscle
5. ☐ Ruptured duodenum ☐

**INCORRECT** ☐

**The correct answer is 5.**

The presentation of this patient is classic for rupture of the duodenum. Patients have vague symptoms because the duodenum is retroperitoneal. If left untreated, mortality is almost 100%. The best way to diagnose it is to maintain a high index of suspicion and conduct repeated physical examinations. Serum amylase is often elevated but is not diagnostic. X-ray films of the abdomen reveal retroperitoneal air, which is the sine qua non of duodenal rupture. Duodenal rupture in children could also result from the use of the lap belt without shoulder support in motor vehicles. This results from acute hyperflexion of the thoracolumbar spine, which crushes the duodenum. Drivers of motor vehicles can also sustain duodenal rupture as a result of compression against the steering wheel. This possibility is greatly reduced by an air bag.

**(Choices 1 & 2)** This patient does not have a ruptured spleen or a ruptured liver, because his vital signs are stable. Moreover, neither condition is associated with midabdominal pain. Rather, pain is in the left or right upper quadrant, respectively, and there may be associated fractures of the lower ribs. A diagnostic peritoneal lavage is positive for hemorrhage, and a computed tomography (CT) scan confirms the diagnosis.

**(Choice 3)** usually follows blunt trauma. Although this diagnosis is a possibility, the duodenum more usually ruptures in injuries like the one described in the scenario. Pancreatic rupture is associated with hypovolemic shock due to tear of the gastroduodenal artery. The common bile duct may be avulsed as well. Serum amylase is raised, but this alone does not confirm the diagnosis. However, a persistently elevated serum amylase suggests this possibility. The diagnosis is best established by maintaining a high index of suspicion. A CT scan confirms the diagnosis.

**(Choice 4)** is a benign condition. The pain is confined to the region of injury and is not vaguely defined. Pain increases with contraction of the abdominal muscles. A localized mass may be present. The diagnosis is clinical, and treatment is supportive.

## 42. Question

1 points

### Category: Surgery

A 59-year-old man comes to the physician because of postprandial abdominal cramps, weakness, light-headedness, and diaphoresis. The symptoms begin 25-30 minutes after eating. He had a partial gastrectomy for intractable peptic ulcer disease two weeks ago. He takes no medications. His temperature is 36.7 °C (98 °F), blood pressure is 130/65 mmHg, pulse is 80/min, and respirations are 18/min. Which of the following is the most appropriate next step in management?

1. ☒ Dietary modification ☐
2. ☐ Endoscopy
3. ☐ Barium swallow
4. ☐ Octreotide
5. ☐ Reconstructive operation

**INCORRECT** ☐

**The correct answer is 1.**

The clinical scenario described is suggestive of early dumping syndrome, a common postgastrectomy complication. Up to 50% of patients with partial gastrectomy may experience this syndrome. The rate is lower for patients who underwent more conservative gastric surgery (e.g., proximal vagotomy). The pathophysiology of this condition involves rapid emptying of hypertonic gastric content into the duodenum and small intestine. This process leads to the fluid shift from intravascular space to the small intestine, release of intestinal vasoactive polypeptides, and stimulation of autonomic reflexes.

**(Choice 3)** The diagnosis is made clinically, but provocative tests and contrast x-ray studies to demonstrate rapid gastric emptying are occasionally used.

**(Choices 2,4 & 5)** Endoscopy does not help to confirm the diagnosis. Dietary changes, including small and frequent meals and avoidance of simple carbohydrates, are tried first, and these are usually effective in the majority of patients. Besides that, the symptoms usually diminish over time. In resistant cases, octreotide, a somatostatin analog or reconstructive surgery should be tried.

43. Question

1 points

**Category: Surgery**

A 34-year-old woman is brought to the emergency department after being hit by a motorbike. Examination shows a 3 cm x 2 cm laceration on the left calf. The wound is dirty and the underlying fascia can be seen. She has had four doses of tetanus toxoid in her life; the last dose was 7-years ago. In addition to wound debridement and surgical management, which of the following is the most appropriate course of action to protect her from developing tetanus?

1. ☐ Nothing more is required as the patient is already vaccinated
2. ☐ Give her tetanus immunoglobulin
3. ☒ Give her tetanus toxoid ☐
4. ☐ Give her both tetanus immunoglobulin and tetanus toxoid
5. ☐ Observe the patient and give her tetanus immunoglobulin and tetanus toxoid if she develops any signs of tetanus

**INCORRECT** ☐

**The correct answer is 3.**

All patients with traumatic wounds should be assessed for the need for tetanus immunoglobulin (TIG), which provides passive, temporary and immediate immunity, or tetanus toxoid (TT), which provides active, prolonged but delayed immunity. The current recommendations are as follows:

History of tetanus toxoid immunization	Clean minor wounds	All other wounds
< 3 doses of tetanus toxoid in past	TT: Yes TIG: No	TT: Yes TIG: Yes
>= 3 doses	TT: Yes if last dose > 10 years ago	TT: Yes if last dose > 5 years ago



TIG: No

TIG: No

All other wounds include those at high risk of allowing growth of the vegetative *C. tetani* organism. Those include wounds that provide an anaerobic environment for growth including puncture wounds, projectile wounds, wounds containing foreign bodies, sites of active infection by other organisms or wounds containing necrotic tissue. The patient described in the vignette should be treated with tetanus toxoid as she has suffered a severe wound at risk of harboring *C. tetani*, and it has been greater than five years since her last booster vaccination.

**(Choice 1)** The protection given by tetanus toxoid vaccination wanes with time and administration of an “early” booster is required after a severe injury even in vaccinated individuals.

**(Choices 2 & 4)** Tetanus immunoglobulin is not required in this individual as she has already had a complete initial series of three tetanus vaccinations.

**(Choice 5)** After the onset of symptoms, therapy is aimed at eliminating the production of tetanospasmin (antibiotics such as metronidazole or penicillin), removing any unbound tetanospasmin (TIG), pharmacologic control of muscle spasms and airway protection I respiratory support.

#### 44. Question

1 points

##### Category: Surgery

A 39-year-old man presented to his physician with a history of back pain that started 2 weeks previously. The patient stated that he had been cleaning the garage for a yard sale when he felt a little pain in his “lower back.” He decided to use some hot packs and analgesics that were available over the counter. Unfortunately, over the past few days, he noticed that the pain had gotten worse. He had stiffness of his back and could not sit for long periods. Walking seemed to help. Whenever he coughed or sneezed, the pain would shoot down his right leg. Physical examination revealed that the patient was in moderate distress. He had spasm and tenderness of the paraspinal muscles on the right lumbar region. His straight-leg raising test was 50 degrees on the right, but full on the left. Additional examination of the right foot revealed weak dorsiflexion and hypesthesia over the first web space. The rest of the neurologic examination was normal. The most likely reason for his symptoms is which one of the following?

1. ☐ Epidural hematoma
2. ☐ Spinal cord astrocytoma
3. ☐ Epidural abscess
4. ☐ Prolapsed intervertebral disk at L4-5 level ☐
5. ☐ Prolapsed intervertebral disk at L5-S1 level

**INCORRECT** ☐

**The correct answer is 4.**

This patient has a prolapsed intervertebral disk involving the L4–5 level. A herniated disk at this level will typically compress the fifth lumbar nerve root. The distribution of sensory deficit in such cases would be along the medial side of the leg and in the web space between the first and second toes. Since the fifth lumbar nerve root is required for effective dorsiflexion of the foot, weak dorsiflexion is to be expected, and is indeed noted on the vignette. These patients have difficulty standing on their heels. The initial management is conservative, bed rest; nonsteroidal analgesics, muscle relaxants, and physiotherapy usually fracture of the temporal bone. It may also occur in patients on anticoagulants or who have bleeding diathesis, but these patients usually have suprachoroid hemorrhage.

**(Choice 1)** is incorrect; epidural hematoma is an acute event. This can result from trauma or in patients who have been on anticoagulants or have bleeding diathesis. The patients usually have sudden localized pain, which could result in cord compression. A computed tomographic (CT) scan will reveal the hemorrhage. Treatment is surgical decompression.

**(Choice 2)** is incorrect; a spinal cord astrocytoma is intradural and intramedullary in location. It usually affects people between the ages of 25 and 40. This is a slow-growing tumor that is associated with a long history of slowly progressive backache. The pain is usually localized, and in some cases may be radicular, namely spreading down along the path of a sensory nerve root. The tumor arises from the gray or white matter of the spinal cord. Pain is followed by motor weakness of the lower extremities, and sensory symptoms are usually the last to occur. Treatment is surgical resection.

**(Choice 3)** is incorrect; an epidural abscess is an acute event and is rare. The patient would have severe localized pain, and tenderness would be noted over the vertebral spine where the abscess is located. In addition, fever may be present. Radiculopathy is unusual. Treatment is surgical.

**(Choice 5)** is incorrect; an L5–S1 prolapsed intervertebral disk compresses the S1 nerve root. Such patients have pain along the lateral side of the leg and hypesthesia over this region and along the little toe. They also have difficulty with plantar flexion and standing on their toes. The ankle jerk is depressed or absent, as the S1 nerve root innervates it. The initial management is the same as that for a prolapsed L4–5 intervertebral disk.

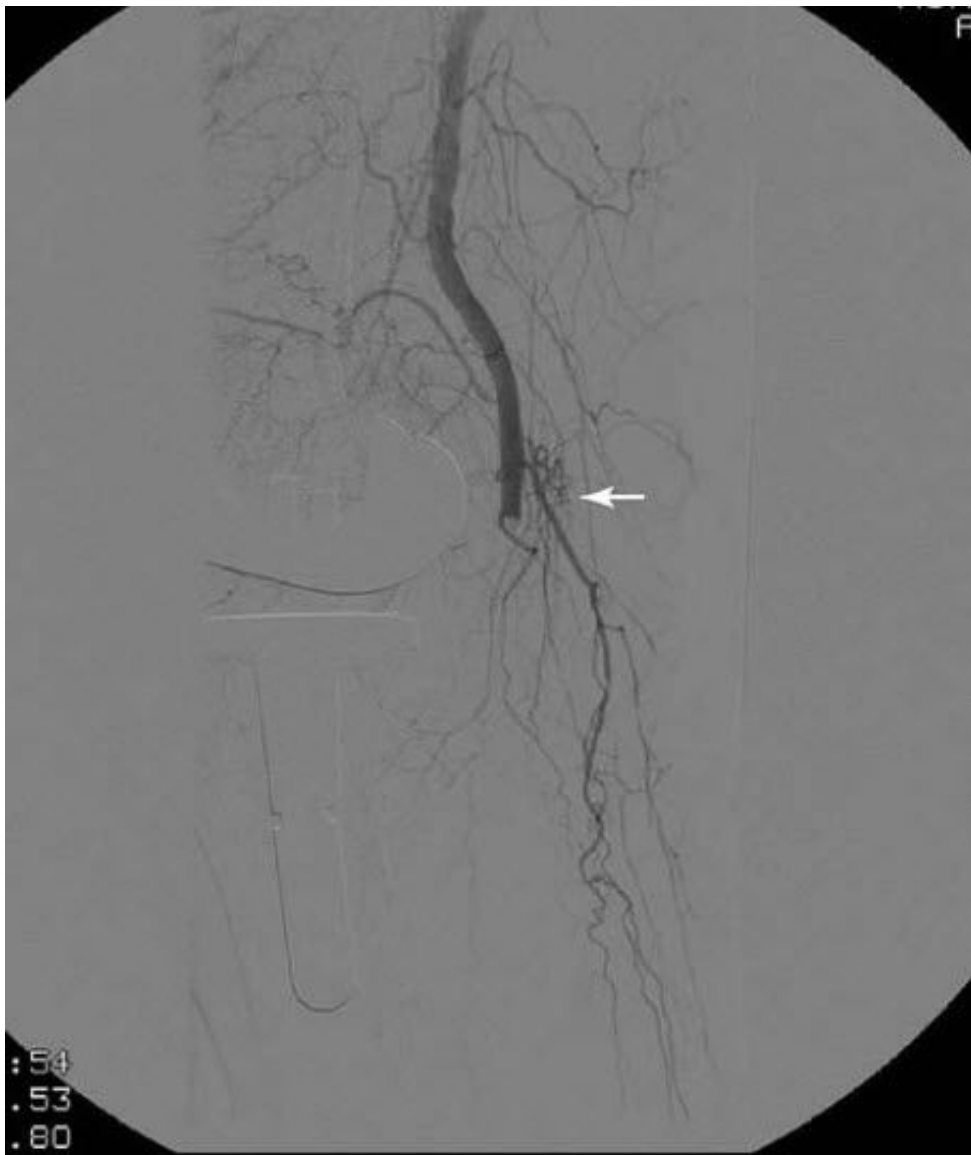
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#### 45. Question

**1 points**

##### **Category: Surgery**

A 66-year-old male presents to the emergency room with acute onset of right leg pain. The patient states that the pain started 2 hours ago and is unrelenting, and he claims that the leg is “tingling.” On your examination, it looks pale and feels cold to touch, and there are no Doppler-able pedal signals. What is the most common cause of the condition shown in this patient’s angiogram?



1. ☐ Deep vein thrombosis
2. ☐ Abdominal aortic aneurysm
3. ☐ Blue toe syndrome
4. ☐ Fat embolism
5. ☐ Atrial fibrillation ☐

**INCORRECT** ☐

**The correct answer is 5.**

An arteriogram is important to define the anatomy and demonstrate the location of vessel occlusion. The superficial femoral artery is the most common site of occlusion, as shown in the angiogram in image above (note the arrow). The cause of a sudden occlusion should be determined. The most common source involves the heart; atrial fibrillation is seen in approximately 85% of all such cases. Other sources include aneurysms and atheromatous plaques proximal to the site of occlusion.

**(Choice 1)** Deep vein thromboses are caused by venous stasis, not seen by angiography.

**(Choice 2)** Although an abdominal aortic aneurysm can be the source of an embolism to the lower extremities, it is less likely than the most common cause, which is from the heart.

**(Choice 3)** Blue toe syndrome occurs when atheromatous plaques are showered from the artery into the periphery. It is usually seen after cardiac catheterization.

**(Choice 4)** A fat embolism can be seen in cases of long bone fractures. It usually occurs in the pulmonary vasculature.

#### 46. Question

1 points

##### Category: Surgery

A 28-year-old woman with sickle cell anemia presents to the urgent care clinic complaining of 12 hours of right upper quadrant pain. She has had similar pain previously, usually after eating fatty foods. However, past episodes have always resolved within one to two hours. On examination, her temperature is 38.3°C and she has right upper quadrant pain with a positive Murphy's sign. Abdominal ultrasound reveals gallstones, a thickened gallbladder wall, and a normal common bile duct. Her alkaline phosphatase level is normal. What is the most appropriate next step in the management of this patient?

1. ☒ Conservative management and elective cholecystectomy ☐
2. ☐ Endoscopic retrograde cholangiography
3. ☐ Emergent cholecystectomy
4. ☐ HIDA scan
5. ☐ Percutaneous transhepatic drainage

**INCORRECT** ☐

**The correct answer is 1.**

This patient is presenting with acute cholecystitis and should be observed prior to undergoing elective cholecystectomy during the same hospitalization. Acute cholecystitis refers to inflammation and distention of the gallbladder, typically due to obstruction of the cystic duct by a gallstone. It presents with acute right upper quadrant pain and tenderness, plus fever and leukocytosis. Physical exam may reveal a positive Murphy's sign. The gallbladder is palpable in 1/3 of cases. Patients with sickle cell anemia are at increased risk of developing gallstones because their ongoing hemolysis increases bilirubin concentrations and drives bilirubin stone formation. Ideally, acute cholecystitis is managed conservatively, with observation followed by elective cholecystectomy during the same hospital admission. Symptoms often subside within a few days with volume resuscitation, antibiotics, and pain medications. However, early cholecystectomy (performed within a few days of presentation)

reduces disease duration, hospitalization length, and cholecystitis-associated mortality. This woman has had ongoing biliary colic, is at high risk for disease recurrence, and does not have any contraindications to surgery. Thus, she should receive supportive care initially and then cholecystectomy within a few days.

**(Choice 2)** ERCP uses a fiberoptic camera to visualize the biliary and pancreatic ducts for diagnostic and therapeutic purposes. It would be reasonable to perform ERCP if the patient had choledocholithiasis or a gallstone in the common biliary duct (CBD) causing CBD dilatation. In such cases, sphincterotomy can help facilitate passage of stones.

**(Choice 3)** Emergent cholecystectomy is required for patients with biliary gangrene or perforation.

**(Choice 4)** The HIDA scan is a nuclear medicine study used to diagnose gallbladder obstruction. With this technique, a nuclear tracer is injected into the blood and collects in the gallbladder. If the tracer is not expelled from the gallbladder, an obstruction is diagnosed. For the patient above, the diagnosis of cholecystitis is not in doubt, so a HIDA scan is not necessary.

**(Choice 5)** Percutaneous transhepatic gallbladder drainage is a technique used to decompress the gallbladder in patients who are unstable or have a contraindication to surgery. This patient is stable and should undergo elective cholecystectomy.

#### 47. Question

1 points

##### Category: Surgery

An 18-year-old man was traveling at a high speed when his car slammed into a wall. He is brought into the emergency department by ambulance. His blood pressure is 60/40 mm Hg, pulse is 115/min and weak, respirations are 18/min, and central venous pressure is 2 cm H<sub>2</sub>O. He is responsive only to painful stimuli. Breath sounds are equal bilaterally, and cardiac auscultation reveals only tachycardia. The abdomen is soft, nondistended, and nontender with active bowel sounds. A chest x-ray film shows a widened mediastinum. Which of the following is the most likely diagnosis?

1. ☐ Cardiac contusion
2. ☐ Cardiac tamponade
3. ☐ Flail chest
4. ☐ Ruptured thoracic aorta ☐
5. ☐ Tension pneumothorax

INCORRECT ☐

**The correct answer is 4.**

This patient experienced a severe deceleration injury. He is hypotensive, tachycardic, and minimally responsive. He is in hemorrhagic shock. The chest x-ray reveals a widening mediastinum, suggesting a rupture of the thoracic aorta, which is a common catastrophic injury in deceleration accidents. This patient is in grave danger. After confirmation of the diagnosis by spiral CT scan, the treatment is immediate surgical repair of the injury with fluid and blood resuscitation.

**(Choice 1)** is common in blunt-force injuries in which the steering wheel has crushed the chest. Arrhythmias, bundle branch block, or ECG abnormalities mimicking infection may occur. Pericardial effusion or rupture may develop.

**(Choice 2)** is associated with hypotension and tachycardia. However, pulsus paradoxus (systolic blood pressure drops > 10 mm Hg on respiration) and distant heart sounds might be discovered on physical examination, and his central venous pressure would be high. Chest x-ray films would show an enlarged cardiac silhouette. The ECG would exhibit low limb-lead voltage and variable QRS amplitude (electrical alternans). However, pericardiocentesis is both the diagnostic and therapeutic procedure of choice.

**(Choice 3)** is diagnosed when a part of the chest wall bound by fractured ribs moves paradoxically during respiration. Ventilation is hampered.

**(Choice 5)** occurs when air can enter but not leave the pleural space. The mediastinum appears to be shifted to the contralateral side on chest x-ray films. A region without peripheral lung markings outlined by a sharp pleural margin is characteristic. Breath sounds are depressed or absent on the affected side.

48. Question

1 points

**Category: Surgery**

A 16-year-old male is brought to the emergency department after falling off a bicycle and hitting the ground with his head. He briefly lost consciousness, but had no seizures. He has a mild headache but has no nausea or vomiting. Vital signs are stable. Examination shows no neurological deficit or any signs of fracture. Which of the following is the most appropriate next step in management?

1. ☐ Discharge the patient home if a skull radiograph is normal and ask him to return if he develops any unusual symptoms.
2. ☐ Discharge the patient home and ask him to return if he develops any unusual symptoms.
3. ☐ Admit the patient; do the imaging study; serial neurological exams every 2 hours.
4. ☐ Admit the patient and observe for neurological signs every 4 hours.
5. ☐ Discharge the patient home if CT scan of head is normal and ask him to return if he develops any unusual symptoms ☐



**INCORRECT** ☐

**The correct answer is 5.**

Most head injuries are mild and will not progress to more serious clinical scenarios. Patients who have suffered head injuries may be classified into low-risk and moderate-risk and high-risk groups. Patients with low-risk head trauma will frequently be asymptomatic or may experience mild headaches or dizziness. Such patients have a GCS of 14 or 15 and have not lost consciousness. Such patients may be discharged with no further imaging or studies if a reliable individual can monitor them for 24 hours following the injury. Patients with moderate-risk head injuries may have any of the following characteristics: evidence of skull fractures, loss of consciousness, emesis, severe headache, amnesia or seizure. These patients should have a CT scan. If the CT scan is normal, such patients may be discharged with printed instructions (list of symptoms) that require immediate return to hospital. Patients with severe head injuries typically display altered or lost consciousness and focal neurologic signs. Such patients may have gross evidence of a depressed skull fracture or penetrating injury to the head. This group of patients requires emergent imaging and assessment for intervention as well as admission to the hospital regardless of findings.

**(Choice 1)** CT scans are superior to skull radiographs for assessing head injury as a CT scan can detect skull fracture as well as hemorrhage, hematoma and displacement of the midline structures in the head.

**(Choices 3 & 4)** Admission is not required for patients with mild to moderate head injuries with normal head CT scans. Admission is indicated in patients with moderate injury and positive findings on imaging or in patients with any severe head injury.

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#### 49. Question

**1 points**

##### **Category: Surgery**

Ten years ago, a 79-year-old female with a 25-year history of type 2 diabetes was diagnosed with diabetic nephropathy. At this time, she is overweight but not obese and she smokes about three packs of cigarettes per week. Despite being diagnosed with diabetic nephropathy, she had not stopped smoking and in general had not tightly controlled her blood glucose levels; consequently, her renal function has steadily deteriorated and her physician now believes she has end-stage renal disease (ESRD). He arranges for her to undergo hemodialysis. Before undergoing hemodialysis, it was also recommended that she have an operation. Which one of the following choices describes the surgical procedure most likely recommended?

1. ☐ A renal biopsy
2. ☐ Insertion of a special, soft catheter through a small slit made adjacent to the naval under local anesthesia
3. ☐ Performing open surgery and inserting a catheter under general anesthetic

- 4. ☐ Formation of an arteriovenous (AV) fistula ☐
- 5. ☐ Removal of a renal stone

**INCORRECT** ☐

**The correct answer is 4.**

To perform hemodialysis, it is necessary to surgically form an arteriovenous (AV) fistula. This is accomplished by creating an opening in which the artery is sewn onto a vein; this is usually done in an arm. In hemodialysis, blood is withdrawn from an artery and returned via a vein. However, veins are typically too small to accommodate the amount of fluid returned and therefore must be enlarged. In an AV fistula, the arterial blood pressure eventually enlarges the vein, thus permitting insertion of a large needle or cannula. Nonsurgical AV fistulas also do occur. These may be congenital or acquired, caused by trauma or by erosion of an arterial aneurism into an adjacent vein. Congenital AV fistulas are uncommon but acquired AV fistulas can be caused by any injury that damages an artery and a vein that lie next to each other. Most often the injury is a piercing wound caused by a knife or a bullet. Symptoms of the fistula may show up immediately or after several hours. If the fistula is superficial, escaping blood often causes swelling. However, in a large, spontaneously acquired AV fistula, the flow of blood under pressure into the venous system stretches the veins and more blood flows through the venous system than through the arterial system. This causes the blood pressure to fall, making the heart pump more vigorously and potentially resulting in high output failure.

A renal biopsy (**Choice 1**) is performed by inserting a long needle into a kidney from the back, usually in a lightly sedated individual. Most commonly, three samples are obtained and evaluated for possible pathologies. Such biopsies are sometimes recommended to help evaluate hematuria, proteinuria, and/or elevated creatinine or blood urea nitrogen (BUN) levels.

**(Choices 2 & 3)** Insertion of a catheter, whether by making a small incision in the abdomen or by performing more invasive surgery, are operations used to perform peritoneal dialysis in which a hypertonic dialysis fluid is added into the patient's peritoneal cavity via an implanted catheter. The hypertonicity of the dialysis solution draws low-molecular-weight molecules (e.g., water, salts, and waste products) from the blood system into the peritoneum, which soon becomes saturated; consequently, the old solution must be drained and replaced by fresh dialysis solution.

**(Choice 5)** is not likely to play a role in treatment of chronic renal failure, although it may play a role in treatment of postrenal acute kidney failure.

A 40-year-old obese woman, mother of five children, presents with progressive jaundice that she first noticed 4 weeks ago. She has a total bilirubin of 22 mg/dL, with 16 mg/dL direct (conjugated) and 6 mg/dL indirect (unconjugated). Her transaminases (AST and ALT) are minimally elevated, but her alkaline phosphatase is about 6 times the upper limit of normal. She has no anemia or occult blood in the stools. She has a history of multiple episodes of colicky right upper quadrant abdominal pain, brought about by the ingestion of fatty food; the last episode occurred a few days before her jaundice was first noted. She currently has no pain and is afebrile. A sonogram of her upper abdomen shows a contracted gallbladder full of stones, as well as dilated intrahepatic and extrahepatic biliary ducts; however, no stone can be identified in the common duct. Which of the following is the most appropriate next step in diagnosis?

1. ☐ Serology to determine presence and type of hepatitis
2. ☐ Endoscopic retrograde cholangiopancreatography (ERCP) ☒
3. ☐ Upper gastrointestinal endoscopy and biopsy of ampullary area
4. ☐ Percutaneous needle biopsy of the liver
5. ☐ Percutaneous needle biopsy of the pancreatic head guided by CT scan

**INCORRECT** ☐

**The correct answer is 2.**

All the findings indicate obstructive jaundice (high alkaline phosphatase, dilated ducts), with gallstones as the source. The fact that no stone can be seen impacted within the common duct is meaningless, since only about 50% of those can be seen by sonogram (the air in the duodenal loop interferes with the study). Endoscopic retrograde cholangiopancreatography (ERCP) can outline the stone and even allow extraction, limiting subsequent surgery to cholecystectomy.

**(Choice 1)** Serology would have been a splendid idea if she had very high transaminases and minimal elevation of the alkaline phosphatase, and if the sonogram had shown normal size ducts.

**(Choice 3)** Ampullary cancer should be suspected in the patient with obstructive jaundice, along with anemia and occult blood in the stool; this is not the case here.

**(Choice 4)** Liver biopsy assumes that we expect intrinsic liver disease, which is not the case here.

**(Choice 5)** Neither should we suspect cancer of the pancreatic head when the gallbladder is contracted rather than dilated and all the signs point to stones as the problem. ERCP will also give us the diagnosis in the case of the rare patient with two diseases (stones plus an unrelated cancer).

**Category: Surgery**

A 45-year-old man is brought to the emergency department after being involved in a motor vehicle collision. He is conscious but in severe pain. His blood pressure is 90/60 mm Hg, pulse is 10 D/min and respirations are 17/min. Physical examination shows marked swelling and some bruising over the right thigh; the skin is intact. An x-ray film of the leg shows a fracture of the mid shaft of the femur. After hemodynamically stabilizing the patient, which of the following is the most appropriate next step in management?

1. ☐ Open intramedullary nailing of the femur
2. ☐ External fixation of the fracture
3. ☐ Place a plaster cast
4. ☐ Internal fixation of the fracture with plates and screw
5. ☐ Closed intramedullary fixation of the femoral shaft ☐

**INCORRECT** ☐

**The correct answer is 5.**

Femoral shaft fractures are generally seen after severe direct trauma. Patients suffering traumatic fractures of the femoral shaft frequently present with signs of shock as a significant amount of blood can be lost into the thigh. On examination, the thigh is often deformed and ecchymotic. The preferred management for femoral shaft fractures is closed intramedullary fixation of shaft with medullary reaming and intramedullary nailing. This allows for early mobilization, improved knee and hip function during recovery and decreased hospital cost. In this technique, closed reduction of fracture segment is followed by intramedullary nail insertion through small skin insertion over the greater trochanter.

**(Choice 1)** Closed intramedullary nailing is preferred over open nailing in closed femoral shaft fractures as it is associated with a lower risk of infection, less soft tissue disruption and a lower risk of nonunion.

**(Choice 2)** External fixation is indicated in certain cases of open fracture where contamination of the wound is significant and the placement of indwelling hardware is contraindicated or when there is significant soft tissue loss around the fracture.

**(Choice 3)** Plaster casting is inappropriate for femoral shaft fractures because there is no traction to maintain femoral length and rotational position and weight bearing would be delayed for a prolonged period of time thereby increasing morbidity.

**(Choice 4)** Plate and screw fixation is reserved only for patients who cannot be treated with intramedullary nailing, such as victims of polytrauma who are unable to be placed on the fracture table.

**Category: Surgery**

A 45-year-old policeman presents to your office complaining of tiredness and sleepiness. He says that his job seems tiring to him recently. It is difficult for him to get up in the morning and go to work. He goes to bed early because he feels tired and sleepy. Two months ago, he was investigating a case of massive murder. He slipped on the blood on the floor, fell and hit his head. He also describes recent abdominal pain that is constant and gnawing, interfering with his sleep. His appetite is poor, and he lost 15 pounds over the last month. Physical examination is significant only for tenderness and fullness in the epigastrium. Which of the following is the most likely diagnosis?

1. ☐ Duodenal ulcer
2. ☐ Major depressive episode
3. ☐ Pancreatic cancer ☐
4. ☐ Post-traumatic stress disorder
5. ☐ Chronic subdural hematoma

**INCORRECT** ☐

**The correct answer is 3.**

The complaints of this patient are daytime fatigue, anorexia, significant weight loss, and visceral-type abdominal pain interfering with sleep. Physical examination reveals a tender, full epigastrium. This combination suggests a malignancy affecting the upper GI tract or associated solid organs, such as the liver, gallbladder or pancreas. Among the choices listed, pancreatic carcinoma is the most likely diagnosis. Note that unlike the presentation in this case, early cancers of the periampullary region of head of the pancreas may present with progressive jaundice as well. Because pancreatic cancer most commonly occurs in the head of the pancreas, the most common presentation of this malignancy is a combination of constant epigastric pain radiating to the back, weight loss and jaundice. Another classic association is migratory thrombophlebitis.

**(Choice 1)** A peptic duodenal ulcer can cause epigastric burning pain, but this is typically periodic and relieved by meals. Anorexia need not be prominent, and because of the latter alleviating factor, weight loss is less common.

**(Choice 2)** A major depressive episode could be responsible for fatigue, anorexia, insomnia and weight loss. Abdominal pain and tenderness would not be typical. The latter findings suggest an organic lesion.

**(Choice 4)** Post-traumatic stress disorder consists of persistent reexperiencing of a previous traumatic event with recurrent attacks of anxiety, hyperarousal, nightmares, and/or flashbacks. It disturbs social and occupational functioning, but does not typically cause anorexia, weight loss or signs of organic disease such as abdominal pain and tenderness.

**(Choice 5)** Since this patient coincidentally has a history of recent blunt head trauma, a chronic subdural hematoma might have developed. This would be more likely in an elderly person and would typically cause headache, personality changes, seizures, confusion or hemiparesis. Abdominal pain and tenderness with anorexia and weight loss would not be expected.

53. Question

1 points

**Category: Surgery**

A 60-year-old woman has a lumpectomy and a sentinel node biopsy performed for an infiltrating ductal carcinoma on the upper outer quadrant of her right breast. The surgical specimen measures 12 by 10 by 8 cm, and all of the surgical margins are reported as negative by the pathologist. The aggregate of the measurements and studies done on the specimen reveals that the size of the tumor was 3.8 by 3.5 by 2.8 cm. Two sentinel axillary nodes removed by the surgeon are negative for metastasis. The tumor is strongly positive for estrogen and progesterone receptors. Histologic grade was III/III, and prognostic studies of flow cytometric S phase, DNA index, ploidy, and Ki-67 antigen are all reported as unfavorable. Prior to surgery, the patient agrees to receive postoperative radiation therapy for the right breast. Which of the following would optimize her chances for a cure?

1. ☐ Chemotherapy and anastrozole ☐
2. ☐ Chemotherapy and tamoxifen
3. ☐ Chemotherapy plus estrogens and progesterone
4. ☐ Completion of the operation to a radical mastectomy
5. ☐ Radiation therapy to the contralateral breast and the right axilla

**INCORRECT** ☐

**The correct answer is 1.**

There are two favorable findings in this patient: Her axillary lymph nodes do not have metastasis, and her tumor is strongly positive for hormonal receptors. However, everything else is unfavorable: The tumor is quite large, and the prognostic factors are all unfavorable. Clearly, the patient would benefit from chemotherapy, and she should be placed on hormonal therapy after chemotherapy and radiation therapy to take advantage of the positive hormonal receptors. The objective of the hormonal manipulations is to either block her receptors (with tamoxifen) or suppress the production of estrogens (with anastrozole). Randomized studies have shown that anastrozole is considerably more effective than tamoxifen in postmenopausal patients. Thus, it has become the drug of choice for that group.



**(Choice 2)** would be the best course of action for premenopausal patients, for whom anastrozole is not yet approved as the best drug. Chemotherapy and tamoxifen would have been the regimen for this patient before the advent of anastrozole.

**(Choice 3)** Adding estrogens and progesterone to the chemotherapy would be contraindicated. We want to deprive the tumor of the stimulation provided by those hormones.

**(Choice 4)** Completion of the operation to a more radical form of resection has no benefits. The patient has a very large margin of normal tissue around the tumor, all the margins are negative, and the patient has agreed to postoperative radiation. We do not cure breast cancer by cutting out more normal tissue. We do it by treating the systemic spread of the disease.

**(Choice 5)** Radiation therapy is focal in nature. It does not treat distant metastatic spread. The patient needs radiation to the breast that had the tumor to minimize the rate of local recurrence. Radiating the other breast and the axilla would not be helpful.

#### 54. Question

1 points

##### Category: Surgery

A 63-year-old man is disease-free two years after bacillus Calmette-Guerin therapy for carcinoma in situ and a grade 2, stage T1 bladder cancer. In addition to physical examination, cystoscopy, and urinary cytology, evaluation at this time should include:

1. ☐ Intravenous pyelogram ☒
2. ☐ Prostatic urethral biopsy
3. ☐ Random biopsies of the bladder
4. ☐ Selective upper tract cytology
5. ☐ Urinary voided cytology, repeated three times

**INCORRECT** ☐

**The correct answer is 1.**

The frequency of development of metachronous upper tract tumors in patients with superficial transitional cell carcinoma (TCC) of the bladder is not exactly known but has been estimated to be very low (1% to 3%). The incidence is higher in patients with higher stage (T2) primary lesions (2% to 8%). Patients treated for high-risk superficial TCC with BCG demonstrate a higher rate (13% to 18%) of upper tract tumors over 3 years of follow-up. The best follow-up approach in patients treated with BCG is, therefore, the addition of upper tract imaging in the form of an intravenous pyelogram or CT urogram. Selective cytology as a routine practice is not recommended.

55. Question

1 points

Category: Surgery

Eight hours after undergoing a transnasal, transsphenoidal resection of a prolactinoma, a young lady becomes lethargic, confused, and eventually comatose. Review of the record shows that her urinary output since surgery has averaged 600 mL/hr, while her intake of N fluids (5% dextrose in 0.45% saline) has been 100 mL/hr. Her blood pressure is 110/75 mm Hg, and her pulse is 88/min. Which of the following would most likely yield the correct diagnosis?

1. ☐ Blood glucose determination
2. ☐ CT scan of the head
3. ☐ Creatinine clearance
4. ☐ Serum levels of ACTH
5. ☐ Serum sodium determination ☐

INCORRECT ☐

**The correct answer is 5.**

The obvious clinical finding is a very large urinary output, which is neither in response to nor being matched by her fluid intake. With a history of surgery in the area of the pituitary gland, we have to suspect that damage to the posterior pituitary gland, or to the stalk, may have occurred and that diabetes insipidus has developed. If that is the case, we will see a significant increase in the serum sodium concentration, explaining the neurologic findings.

**(Choice 1)** Blood glucose would not be increased by the fluids she is getting. It could be decreased if pituitary insufficiency and secondary adrenal insufficiency had developed, but in that case the presentation would have been one of otherwise unexplained shock.

**(Choice 2)** CT scan of the head would have been a good idea if she had a normal urinary output but had reported a horrible headache, followed by neurologic deterioration, suggesting intracranial bleeding.

**(Choice 3)** Creatinine clearance assumes that something is intrinsically wrong with the kidneys. Her kidneys are fine; they simply are not getting ADH and therefore are excreting high volumes of much diluted urine.

**(Choice 4)** Serum levels of ACTH follows the same line of reasoning as **(Choice 1)**.

Secondary adrenal insufficiency would have produced shock, hypoglycemia, and hyperkalemia in a patient who would be awake and not “peeing out a storm.”

**Category: Surgery**

A middle-aged man with symptomatic carotid stenosis underwent a carotid endarterectomy on the right side. The area of significant stenosis extended from the carotid bifurcation up into the internal carotid, requiring a very high dissection and clamping of the vessel. The endarterectomy was done with an in situ shunt and closed with a Dacron patch. In the postoperative period, the patient has persistent difficulty swallowing solids and even more difficulty swallowing liquids. Any attempt to do so results in violent coughing and aspiration. His lips look symmetric and move normally, he speaks in a normal tone of voice without tiring, and he has no trouble breathing. When he is asked to stick his tongue out, he does so without deviation to either side. His symptoms are due to intraoperative damage of which of the following nerves?

1. ☐ Main trunk of the tenth (vagus) nerve
2. ☐ Mandibular branch of the seventh (facial) nerve
3. ☐ Sensory fibers of the ninth (glossopharyngeal) nerve ☐
4. ☐ Superior laryngeal branch of the tenth (vagus) nerve
5. ☐ Trunk of the twelfth (hypoglossal) nerve

**INCORRECT** ☐

**The correct answer is 3.**

Sensory fibers of the ninth (glossopharyngeal) nerve are in the vicinity of the digastric muscle, and can be damaged by retraction and dissection in the area. The lack of sensory input at the base of the tongue prevents the normal protective reflex that closes the glottis when swallowing liquids.

**(Choice 1)** Unilateral injury to the main trunk of the vagus in the neck would produce symptoms from the recurrent fibers that innervate the larynx, producing a hoarse voice but no change in swallowing.

**(Choice 2)** Injury to the mandibular branch of the facial nerve would produce drooping of the corner of the mouth and leaking of fluid at that level. Soup running out of the corner of the mouth is annoying, but swallowing is not affected.

**(Choice 4)** If the superior laryngeal branch of the vagus is damaged, the voice tires easily. Swallowing is not affected.

**(Choice 5)** The twelfth nerve is the most commonly damaged nerve during carotid endarterectomy because it crosses the internal and external carotids a short distance cephalad to the bifurcation. However, the outcome is deviation of the tongue to the affected side.

## 57. Question

1 points

**Category: Surgery**

A 46-year-old male comes to the emergency department because of an abrupt onset of worsening epigastric pain radiating to the back and vomiting. His temperature is 36.5 °C (97.6 °F), blood pressure is 100/70 mm of Hg, pulse is 100/min and respirations are 20/min. Examination shows a mildly distended abdomen that is very tender to palpation in the epigastric region without rebound; bowel sounds are absent; rectal examination shows no abnormalities. An x-ray film of the abdomen shows gaseous distention of the small bowel in the upper abdomen. CT with contrast shows diffuse hypodense enlargement of the pancreas and peripancreatic and perirenal fluid collections. Nasogastric suction, intravenous normal saline, analgesics and antibiotics are started. Laboratory studies show:

**Hemoglobin:** 15.0 g/L**Platelets:** 223,000/mm<sup>3</sup>**Leukocyte count:** 14,500/mm<sup>3</sup>**Serum sodium:** 134 mEq/L**Serum potassium:** 3.6 mEq/L**Chloride:** 93 mEq/L**Bi carbonate:** 29 mEq/L**Blood urea nitrogen (BUN):** 30 mg/dl**Serum creatinine:** 0.8 mg/dl**Calcium:** 10.3 mg/dl**Blood glucose:** 168 mg/dl**Total bilirubin:** 1.4 mg/dl**Alkaline phosphatase:** 220 U/L**Aspartate aminotransferase (SGOT):** 88 U/L**Alanine aminotransferase (SGPT):** 155 U/L**Lipase:** 523 U/L

Which of the following is the most appropriate next step in management?

1. ☐ Add intravenous sodium bicarbonate
2. ☐ Add intravenous pancreatic protease inhibitor
3. ☐ Colonoscopic decompression
4. ☐ Administer intramuscular carbachol to treat ileus
5. ☐ Obtain a right upper quadrant ultrasound ☐

INCORRECT ☐

**The correct answer is 5.**

The patient described is suffering from acute pancreatitis with a secondary ileus. The most common causes of acute pancreatitis are gallstones, alcohol consumption, hypertriglyceridemia and recent ERCP. Treatment of pancreatitis is primarily supportive with intravenous fluids, NG tube suction, NPO and analgesia. In severe cases, antibiotics are indicated, and calcium and magnesium levels should be monitored and replaced as needed. A cause for the pancreatitis should also be sought. Choledocholithiasis is the most common cause of pancreatitis, and an ultrasound study early in the disease process may detect the offending stone before it is passed.

**(Choice 1)** The patient has evidence of a mild metabolic alkalosis (increased  $\text{HCO}_3^-$ ) most likely due to vomiting. Bicarbonate is not indicated at this time.

**(Choice 2)** Evidence does not support the use of pancreatic protease inhibitors in acute pancreatitis.

**(Choices 3 & 4)** Carbachol is a cholinomimetic agent that stimulates contraction of the bowel musculature. As such, it may contract the sphincter of Oddi thereby worsening this patient's pain. In fact, anticholinergics have been tested in the treatment of acute pancreatitis in an effort to relax this sphincter but have shown no benefit. This ileus is expected to resolve with the improvement of the pancreatitis.

58. Question

1 points

**Category: Surgery**

A 32-year-old man comes to the emergency room (ER) because of acute onset left flank pain, hematuria and vomiting. His pain is relieved with ketorolac in the ER. He has a history of abdominal pain due to Crohn disease, but that pain was always in the right lower quadrant and was never this severe. His temperature is 36.8 °C (98.2 °F), blood pressure is 120/65 mm Hg, pulse is 110/min and respirations are 16/min. Chest auscultation is clear. Abdomen is soft and mildly tender over the left flank. He has no rebound or rigidity. Bowel sounds are decreased. A laparotomy scar is present in right lower quadrant. Which of the following is the most likely cause of his symptoms?

1. ☐ Increased recycling of bile salts and fatty acids
2. ☐ Increased absorption of oxalate ☐
3. ☐ Increased absorption of calcium
4. ☐ Increased parathyroid hormone activity
5. ☐ Recurrent bacteria infection in the kidney

**INCORRECT** ☐

**The correct answer is 2.**

The patient described is experiencing symptoms consistent with nephrolithiasis, which classically presents with flank pain and hematuria frequently accompanied by nausea and vomiting. Patients with Crohn disease, or any other small intestinal disorder resulting in fat malabsorption, are predisposed to hyperoxaluria. Oxalate is obtained from the diet and is a normal product of human metabolism. Symptomatic hyperoxaluria is classically the result of increased oxalate absorption in the gut. Under normal circumstances, calcium binds oxalate in the gut and prevents its absorption. In patients with fat malabsorption, calcium is preferentially bound by fat leaving oxalate unbound and free to be absorbed into the bloodstream. Failure to adequately absorb bile salts in states of fat malabsorption also cause decreased bile salt reabsorption in the small intestine. Excess bile salts may damage the colonic mucosa and contribute to increased oxalate absorption.

**(Choice 1)** Bile salt recycling and fatty acid absorption are decreased in Crohn disease.

**(Choices 3 & 4)** Hypercalciuria, which may be idiopathic or may result from hyperparathyroidism, excessive calcium and vitamin D ingestion, dehydration or prolonged immobilization, predisposes to calcium stone formation.

**(Choice 5)** Recurrent urinary tract infections, particularly by *Proteus* species, predispose to struvite stone formation. Struvite stones may eventually grow to fill the entire renal pelvis, at which point they are known as “staghorn” calculi.

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59. Question

1 points

**Category: Surgery**

A 26-year-old woman planned to go biking. As she was dressing, she noticed her period had just started, so she inserted a tampon. While biking, a car turned right immediately in front of her; she crashed into it and catapulted over the hood. She was unable to get up, and when she looked at her right leg, she found that her knee had traveled more than half way up her thigh. The paramedics approximately realigned the femur, splinted it, and transported her to a local hospital, where they set the fracture by implanting a metal rod down the shaft of the bone. Because of her blood loss she was administered two units of blood, after which her hemoglobin level was 7 g/dL. After 2 days in the hospital, the surgical wound continued to seep blood, but she seemed on the road to recovery and was transferred to a neighboring rehabilitation facility. Because of everything else going on, nobody thought of replacing the tampon. The morning after arriving at the rehabilitation facility, she complains of dizziness and a feeling of weakness and seems somewhat disoriented. She has a temperature of 103°F (39.4°C) and has a generalized rash that even covers her hands and the soles of her feet. Her skin is warm to the touch, and her blood pressure is 150/90 mm Hg. The duty nurse calls in a physician, who arrives 45 minutes later. By the time the physician gets there, the patient's skin appears gray and is cold and clammy, she has tachycardia and the heart sounds are weak, she has a shallow and rapid rate of breathing, her blood pressure is 74/49 mm Hg, her eyes are lusterless, and she is staring without showing signs of recognizing anything. At this time, which of the following choices represents the most probable diagnosis?



1. ☐ Hypovolemic shock
2. ☐ Toxic shock syndrome ☐
3. ☐ Cardiogenic shock
4. ☐ Anaphylactic shock
5. ☐ Shock cause by a gram-negative organism

**INCORRECT** ☐

**The correct answer is 2.**

Shock is a condition in which peripheral blood flow is compromised, depriving cells of adequate oxygen supply. Several different conditions can cause shock, but there is commonality in the symptoms produced. By the time she is seen by the physician, the patient described is suffering from toxic shock syndrome (TSS) due to failure to remove the tampon over the course of 4 days. The early phase, including high temperature, rash, hypertension, and warm skin, reflects the inflammatory effects of toxins caused by bacteria growing in the tampon. In TSS, this phase generally lasts about 30 minutes and is then followed by the more typical symptoms of shock due to a toxin-induced shutdown of the vascular system. These typical shock symptoms include pale or gray skin that is cold and clammy to the touch; tachycardia with weak heart sounds; shallow, rapid breathing; hypotension; lack of focus with confusion; and possibly delirium. In the 1980s, a small epidemic of TSS was associated with a specific brand of “super-absorbant” tampons that allegedly could be left in place for an extended period. Since that brand was removed from the market, the condition has become much less common. TSS more often occurs in response to factors other than tampon use in menstruating women. The hypothesis regarding tampon-induced TSS is that, when women leave tampons in place for a long time, they may become infected with *Staphylococcus aureus*. This bacteria breeds in the tampons and produces toxins that induce septic shock. The tampons are a perfect growth medium, the environment is warm and moist, and the blood is a rich source of nutrients. Moreover, while in the tampon, the bacteria cannot be affected by normal physiologic defense mechanisms and are largely immune even to the influence of antibiotics.

**(Choice 1)** can be caused by loss of blood (either externally as by a wound or internally as in gastrointestinal bleeding or a fractured femur) or by dehydration from loss of fluid from extravascular compartments (as in vomiting or diarrhea). The symptoms are the same as those described for this patient, but the onset of shock would not be preceded by the early reaction to toxins.

**(Choice 3)** occurs when the supply of blood to peripheral tissues falls below a critical level because of inadequate pumping ability of the heart. The symptoms again are as those described, and the condition may be caused by a myocardial infarct, heart failure, cardiac arrhythmias, or cardiac tamponade.

**(Choice 4)** is caused by an allergic reaction to any of a host of potential allergins. As in TSS, shock is preceded by a brief inflammatory period. However, there is no reason to suspect an allergic reaction in the case presented.

**(Choice 5)** would represent classic septic shock, likely caused by an ingested pathogen or infection from gastrointestinal or urinary tract pathogens. As in TSS and anaphylactic shock, the onset of shock is preceded by a brief inflammatory period. However, gram-negative bacteria are rarely, if ever, associated with tampon-induced shock.

60. Question

1 points

**Category: Surgery**

A 62-year-old female is hospitalized with epigastric pain and vomiting. Her past medical history includes mild COPD, congestive heart failure, diabetes mellitus and a stroke that occurred 2 years ago. Her current medications are insulin glargine and aspirin. Her blood pressure is 110/70 and her heart rate is 76/min. Comprehensive work-up is suggestive of acute calculous cholecystitis, and a cholecystectomy is planned. Which of the following would reduce postoperative mortality in this patient?

1. ☐ Vancomycin
2. ☐ Enalapril
3. ☐ Metoprolol ☒
4. ☐ Verapamil
5. ☐ Metformin

**INCORRECT** ☐

**The correct answer is 3.**

Perioperative or postoperative myocardial infarction (MI) occurs in approximately 0.5% of patients undergoing non-cardiac surgery. This incidence increases to 5-10% in patients who are over the age of 70 or who have preexisting atherosclerotic conditions, cardiac conditions such as heart failure, or ischemia identifiable on cardiac stress testing. Major risk factors for perioperative cardiac ischemia include cardiac ischemia demonstrable by symptoms or noninvasive testing, heart failure, insulin-dependent diabetes mellitus, renal insufficiency, arrhythmias or AV block, history of stroke, advanced age, uncontrolled hypertension and low functional capacity. These risk factors can be used to determine a patient's overall cardiac risk for a given procedure. Not all procedures carry the same cardiac risk. High risk procedures include emergency and major vascular operations; intermediate risk procedures include orthopedic, intraperitoneal and intrathoracic procedures; and low risk procedures include endoscopy and minor procedures of the skin or eye. The patient in the vignette is at intermediate risk for cardiac complications during or after surgery. Numerous studies have shown that administration of a  $\beta$ -adrenergic receptor antagonist before, during and after

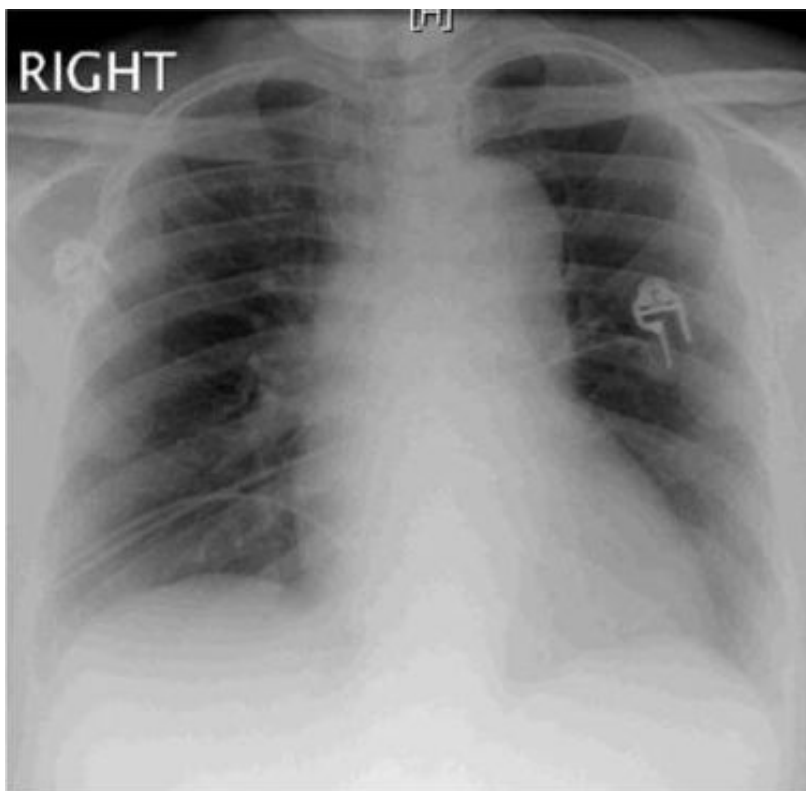
surgery in at-risk patients significantly lowers the incidence of perioperative myocardial ischemic events. Beta-blockers exert this cardioprotective effect by decreasing cardiac work and causing a resultant decrease in myocardial oxygen demand.

61. Question

1 points

**Category: Surgery**

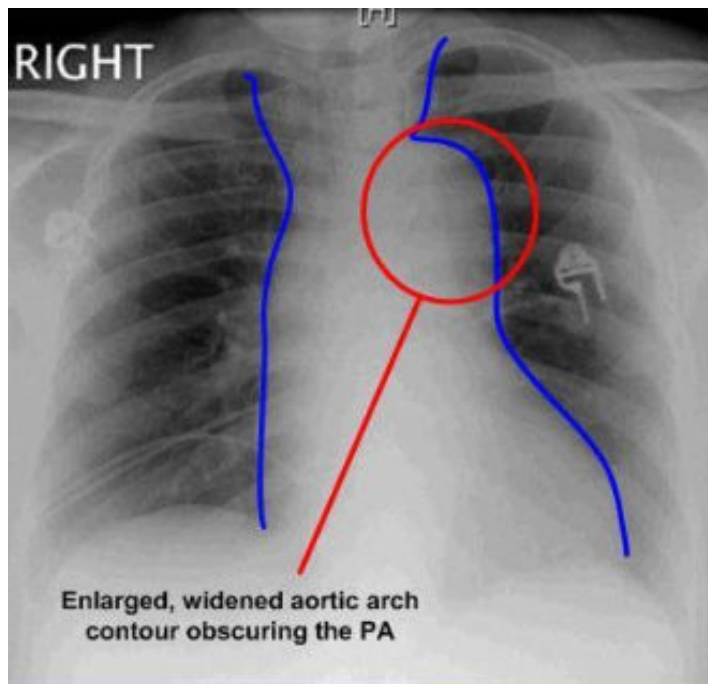
A 43-year-old male with a history of schizoaffective disorder is brought to the emergency room after falling from the third floor of an apartment building. He appears scared and points to his chest asking for help. His blood pressure is 137/91 mmHg and his heart rate is 120/min. Chest x-ray is shown below.



What is the most likely diagnosis?

1. ☐ Myocardial contusion
2. ☐ Left ventricular aneurysm
3. ☒ Aortic injury
4. ☐ Hemothorax
5. ☐ Pulmonary contusion

INCORRECT ☐



**The correct answer is 3.**

For patients involved in motor vehicle accidents or falls from > 10 feet, physicians must have a high suspicion for blunt aortic injury. Blunt aortic injury carries a high mortality rate, making expeditious detection and treatment critical. Though clinical signs and symptoms are highly variable, anxiety, tachycardia and hypertension are common. Therefore, radiographic imaging is critical to diagnosis and should be obtained whenever the mechanism of injury raises suspicion for blunt aortic injury. Chest x-ray is an appropriate initial screening study. Mediastinal widening is the most sensitive finding for blunt aortic injury. Deviation of the trachea or nasogastric tube to the right or depression of the left mainstem bronchus may also be seen. Here the chest x-ray shows substantial mediastinal widening, sufficient for diagnosis. Where the history and chest x-ray findings are equivocal, chest CT and angiography are appropriate.

**(Choice 1)** Myocardial contusion may also result from blunt trauma. Tachycardia is a common sign, and chest x-ray may demonstrate rib fractures, a common cause of cardiac contusion. Mediastinal widening is not seen with myocardial contusion alone.

**(Choice 2)** Left ventricular (LV) aneurysm may present on chest x-ray as a prominence or bulge along the left heart border. LV aneurysm is most commonly seen as a complication of transmural myocardial infarction, and is not associated with trauma. It is best diagnosed by echocardiogram.

**(Choice 4)** Hemothorax is indistinguishable from pleural effusion on chest x-ray. Blunting of the costophrenic angle, or even partial to complete opacification of one hemithorax might be expected from a significant hemothorax.

**(Choice 5)** Pulmonary contusion is the most common finding after blunt chest injury. Chest x-ray reveals opacities caused by hemorrhage in the involved lung segments.

**Category: Surgery**

A 32-year-old woman has an episode of upper gastrointestinal bleeding after a night of heavy alcoholic intake followed by ingestion of multiple aspirin tablets for the hangover. There was no prior vomiting until the time when she felt nauseated, went to the bathroom, and “filled the wash basin with vomiting of bright red bloody fluid.” When she arrives in the emergency department, an upper gastrointestinal endoscopy is promptly performed, which confirms a diagnosis of acute erosive gastritis. She has no duodenal ulcer and no esophageal varices. Gastric lavage with ice-cold saline is performed and the bleeding stops. Laser photocoagulation or electrocautery are not used, neither is Pitressin infused. She remains hemodynamically stable throughout the procedure, and she has normal hemoglobin. She is sent home 2 hours later. Four hours after discharge, she returns complaining of severe, constant chest pain. She is in acute distress, has a temperature of 39.0 C (102.2 F), is having chills, and looks quite ill. Physical examination is remarkable for the presence of crepitation to palpation in the upper chest and lower neck, and chest x-rays confirm the presence of air in the mediastinum and the subcutaneous tissues. Which of the following is the most likely diagnosis?

1. ☐ Boerhaave syndrome
2. ☐ Dissecting thoracic aortic aneurysm
3. ☐ gastric perforation
4. ☐ Iatrogenic esophageal perforation ☐
5. ☐ Myocardial infarction

**INCORRECT** ☐

**The correct answer is 4.**

Acute mediastinitis with air in the tissues that occurs within a few hours of an upper gastrointestinal endoscopy is virtually diagnostic of instrumental, iatrogenic esophageal perforation.

**(Choice 1)** is also a form of esophageal perforation, but it is caused by protracted, forceful vomiting, which this patient did not have.

**(Choice 2)** A dissecting aneurysm of the thoracic aorta can mimic a myocardial infarction, but it would not fill the mediastinum with air.

**(Choice 3)** In upper gastrointestinal endoscopy, the esophagus, which has narrow lumen and a flimsy wall, can be perforated easily, but the stomach, which has ample lumen and a thick, strong wall, almost never is. Furthermore, other than looking, nothing was done that could damage the stomach (laser or electrocoagulation). Finally, a hole in the stomach gives an acute abdomen with free air under the diaphragm, rather than mediastinitis with air in the mediastinum.

**(Choice 5)** A real myocardial infarction is rare in a 32-year-old, and like the previous option, it produces pain but not mediastinitis with air.

63. Question

1 points

**Category: Surgery**

A 73-year-old male who is a nursing home resident underwent a laparotomy for intestinal obstruction. He has advanced dementia. On the 8th postoperative day, he complains of pain and swelling on the left angle of his jaw. His temperature is 38.9 °C (102.0 °F), blood pressure is 150/80 mm Hg, pulse is 90/min, and respirations are 16/min. Examination shows swelling, erythema, and tenderness in the region of the left parotid gland. Laboratory studies show a white blood cell count of 15,600/mm. Which of the following measures would most likely have prevented this complication?

1. ☐ Incentive spirometry
2. ☐ Beta blockers
3. ☐ Avoiding antibiotics
4. ☐ Tetanus toxoid
5. ☐ Polysaccharide vaccine
6. ☐ Adequate fluid intake and oral hygiene ☐
7. ☐ Early ambulation

**INCORRECT** ☐

**The correct answer is 6.**

This patient's fever, leukocytosis, and parotid inflammation suggest acute bacterial parotitis. Dehydrated post-operative patients and the elderly are most prone to develop this infection. Acute bacterial parotitis presents with painful swelling of the involved parotid gland that is aggravated by chewing. Prominent physical exam findings are a tender, swollen and erythematous gland; with purulent saliva expressed from the parotid duct. The most common infectious agent is *Staphylococcus aureus*. Adequate fluid hydration and oral hygiene, both pre- and post-operatively, can prevent this complication.

**(Choice 1)** Incentive spirometry has been shown to reduce post-operative pulmonary complications by 50%. It will not prevent parotitis.

**(Choice 2)** Perioperative use of  $\beta$ -blockers in patients with coronary artery disease decreases the likelihood of myocardial ischemia.

**(Choice 3)** Perioperative antibiotics should routinely be given to patients undergoing abdominal surgery.

**(Choice 4)** Tetanus toxoid is used to prevent tetanus. This illness presents with lockjaw, muscles spasms, and seizures.



**(Choice 5)** Polysaccharide vaccine is indicated in all patients over 65 to prevent illnesses caused by *Streptococcus pneumoniae*. The most common cause of parotitis is *Staphylococcus aureus*.

**(Choice 7)** Early ambulation is one of many proven methods of preventing post-operative complications, particularly deep venous thrombosis.

64. Question

1 points

**Category: Surgery**

A 66-year-old male presents to the emergency room with acute onset of right leg pain. The patient states that the pain started 2 hours ago and is unrelenting, and he claims that the leg is “tingling.” On your examination, it looks pale and feels cold to touch, and there are no Doppler-able pedal signals. What is the most appropriate next step in the management of this patient?

1. ☐ CT scan
2. ☐ IV heparin drip ☐
3. ☐ Ankle-brachial index
4. ☐ Bedrest with lower extremity elevation
5. ☐ Venous duplex

**INCORRECT** ☐

**The correct answer is 2.**

Acute arterial occlusion is an acute event typically caused by embolization. It can also be seen in thrombosis of an atheromatous plaque or in vascular trauma. Rapid intervention is required to avoid permanent sequelae. The diagnosis is made by physical exam and is characterized by the “six P’s”: pain, paralysis, pallor, paresthesia, poikilothermy, and pulselessness. The most appropriate immediate treatment consists of anticoagulation with IV heparin.

**(Choice 1)** A CT scan is an inappropriate choice for imaging because it does not evaluate peripheral arterial disease.

**(Choice 3)** An ankle brachial index (ABI) is used to evaluate arterial insufficiency. In this patient with no Doppler-able pedal signals, it will not assist in the diagnosis.

**(Choices 4 & 5)** A venous duplex and bedrest with lower extremity elevation would be more appropriate in patients with venous stasis, not in patients with arterial disease.

**Category: Surgery**

A 65-year-old white woman slipped and fell on an icy walkway. When seen in the emergency department, she complained of pain in the right hip, and had shortening and external rotation of the right leg. X-ray films confirmed a diagnosis of a fractured femur neck, for which she underwent arthroplasty. Two days after surgery, she complained of difficulty breathing. On clinical examination, her vital signs were as follows: pulse, 88/min; temperature, 36.9°C (98.4°F); respiration, 18/min; and blood pressure, 130/90 mm Hg. She had distended jugular neck veins. Auscultation of the heart revealed a third heart sound, while that of the chest revealed bibasilar inspiratory crackles. In addition, she had dependent pitting edema. Results of a complete blood cell count including platelet count were normal. Which of the following is the most likely diagnosis?

1. ☐ Endotoxic shock
2. ☐ Cardiogenic shock
3. ☐ Overzealous fluid resuscitation ☐
4. ☐ Fat embolism syndrome
5. ☐ Syndrome of inappropriate antidiuretic hormone

**INCORRECT** ☐

**The correct answer is 3.**

The patient has volume overload due to overzealous fluid resuscitation during and after surgery. Volume overload is the most common cause of congestive cardiac failure after surgery. A third heart sound is the first cardiac sign of left or right-sided congestive heart failure. Bibasilar inspiratory crackles indicate left-sided heart failure, and jugular venous distention and peripheral pitting edema are features of right-sided heart failure. Volume overload can be corrected by administration of a loop diuretic and by restricting fluid volume. It is always important to monitor fluid intake and output carefully in patients to avoid inadvertent fluid overload.

**(Choices 1 & 2)** Endotoxic shock and cardiogenic shock are incorrect responses because the patient has a normal blood pressure.

**(Choice 4)** is associated with tachycardia, dyspnea, thrombocytopenia, and petechiae over the chest. The latter two findings are not present in this patient.

**(Choice 5)** is not associated with peripheral pitting edema because it refers to retention of water without sodium. Serum sodium is usually less than 120 mEq/L; water restriction is the treatment of choice.

## Category: Surgery

A 63-year-old obese female undergoes an elective cholecystectomy after two episodes of acute calculous cholecystitis. Three days after surgery, her blood pressure is 150/100 mmHg, her heart rate is 90/min, and her arterial oxygen saturation is 91 % on room air. She is afebrile. Which of the following would most likely increase her functional residual lung capacity?

1. ☐ Inhaled albuterol
2. ☐ Sequential compression devices to her lower extremities
3. ☐ Elevation of the head of the bed ☒
4. ☐ Decreasing the dose of her postoperative opioids
5. ☐ Postoperative benzodiazepines

**INCORRECT** ☒

**The correct answer is 3.**

Respiratory complications are a common cause of postoperative morbidity and mortality. After upper abdominal surgery, a combination of factors can cause the vital capacity (VC) to fall 50% and the functional residual capacity (FRC) to fall 30%. First, postoperative pain promotes shallow, rapid breathing. Narcotic analgesics further decrease respiratory drive, deep inspirations and coughing. Some anesthetic agents depress mucociliary clearance and may promote bronchiolar obstruction as well. Additionally, obese patients will experience a Pickwickian-like syndrome when kept chronically supine following surgery. These factors together promote alveolar atelectasis, a major cause of FRC reduction. Atelectasis is the most common respiratory complication during the first 24 hours after surgery. It not only impairs gas exchange by decreasing the number of alveoli available for gas exchange, but it also predisposes to pneumonia. Chest physiotherapy, incentive spirometry, coughing and frequent repositioning/early ambulation are all methods that can be used to increase the FRC and prevent atelectasis in the immediate postoperative period. Simply moving the patient from supine to sitting reduces the intraabdominal pressure acting on the undersurface of the diaphragm thereby permitting greater alveolar expansion at end expiration and increasing the FRC.

**(Choice 1)** Bronchodilators do not significantly affect the FRC in patients without a history of obstructive lung disease. Bronchodilators may be used in normal individuals during the postoperative period to help prevent a fall in FRC secondary to bronchospasm, but they would not be expected to dramatically improve the FRC.

**(Choice 2)** Intermittent leg compression is important in the prevention of deep vein thromboses and pulmonary emboli, but does not affect the FRC directly.

**(Choice 4)** Opioid analgesics can suppress the respiratory drive. Decreasing the dosage of these medicines can help to prevent FRC reductions, but this would not alone dramatically increase the FRC, nor is it always possible in the immediate postoperative period as abdominal pain also limits lung expansion.

**(Choice 5)** Benzodiazepines can cause variable degrees of respiratory depression and would tend to favor the development of postoperative atelectasis and a consequent reduction in FRC.

67. Question

1 points

**Category: Surgery**

An 18-year-old female is seen in the ED with a 1-day history of abdominal pain. The patient states that the pain began periumbilically as a dull ache, but it has since migrated to the right lower quadrant. It is now sharp and constant in nature. This morning, the patient began vomiting and had one episode of diarrhea. She is sexually active and her last menstrual period ended 7 days ago. On exam, she is ill appearing and tachycardic. There is involuntary guarding in both quadrants of the lower abdomen. A pelvic exam reveals tenderness noted upon movement of the cervix and during rectal exam. A CBC demonstrates a leukocytosis of 13,000, and  $\beta$ -hCG is negative.

Further radiographic imaging demonstrates acute appendicitis. The patient is taken to the operating room for surgical exploration. Two days later, the pathology report reveals a 1 cm carcinoid tumor at the tip of the appendix. What further treatment should be implemented?

1. ☐ CT scan of the abdomen and pelvis for metastatic staging
2. ☐ No further treatment ☐
3. ☐ Radiation therapy
4. ☐ Right hemicolectomy
5. ☐ Chemotherapy

**INCORRECT** ☐

**The correct answer is 2.**

The most common tumor of the appendix is a carcinoid tumor. Benign tumors, including carcinoids, are found in fewer than 5% of appendix specimens examined microscopically. They are most commonly found incidentally at the time of an appendectomy being performed for acute appendicitis. Tumors smaller than 2 cm in the tip of the appendix are unlikely to metastasize. Most authors recommend appendectomy for tumors less than 2 cm. Appendectomy alone is adequate treatment unless lymph nodes are visibly involved, the tumor is larger than 2 cm in diameter, mucinous elements are present in the tumor (adenocarcinoid), or the mesoappendix or base of the cecum is invaded.

**(Choice 1)** No staging is required due to the low probability of metastatic disease.

**(Choice 3 & 5)** Radiation therapy and chemotherapy have no role in the treatment of localized carcinoid tumors.

**(Choice 4)** For tumors larger than 2 cm or with more aggressive lesions, the patient should undergo a right hemicolectomy.

68. Question

1 points

**Category: Surgery**

You evaluate a 42-year-old male driver in the emergency room who has previously been involved in a high-speed, head-on, motor vehicle accident. His GCS is 15. After the initial ABCs of trauma care are completed, you note that the only significant injury appears to involve the patient's abdomen. The abdominal exam shows diffuse tenderness, peritoneal signs, and seat belt imprint on the lower chest and abdomen. The patient is taken to the OR; during the ensuing surgical exploration, you repair a small bowel mesentery laceration and find a large, right retroperitoneal hematoma surrounding the right kidney. In what zone is this retroperitoneal hematoma found?

1. ☐ Zone I
2. ☐ Zone II ☒
3. ☐ Zone III
4. ☐ Zone IV
5. ☐ Zone V

**INCORRECT** ☐

**The correct answer is 2.**

In evaluation of abdominal trauma, the retroperitoneum is divided into three zones. Zone I (the central zone) contains the majority of the vasculature within the abdomen (i.e., the aorta, vena cava, celiac trunk, and mesenteric arteries). This zone should always be explored in both penetrating and blunt trauma. Zone II (the lateral zone) lies on either side of Zone I. The kidneys and their vasculature are found within this area. Exploration should be undertaken in penetrating trauma, or in blunt trauma with a pulsatile expanding hematoma. Zone III consists of the pelvic retroperitoneum; the iliac vessels and the hypogastric plexus are found here. This is a difficult area to explore, and obtaining hemostatic control is challenging. Mandatory exploration should occur in penetrating trauma cases. In cases involving blunt trauma, exploration should be undertaken if the hematoma is expanding or is pulsatile. Otherwise, no exploration is the best management choice.

**(Choices 1 & 3)** See the correct answer **(Choice 2)**.

**(Choices 4 & 5)** There are only three zones of the retroperitoneum.

## 69. Question

1 points

## Category: Surgery

A 75-year-old man presents with puffiness of the face, arms, and shoulders associated with a bluish to purple discoloration of the skin. In addition, he complains of dizziness, shortness of breath, and cough. He has a 35 pack-year history of smoking. Physical examination reveals clubbing of the fingernails, emphysematous chest, and distended neck veins. The pathogenesis for this patient's findings most likely results from which one of the following disorders?

1. ☐ Primary lung cancer ☐
2. ☐ Pericardial effusion
3. ☐ Sclerosing mediastinitis
4. ☐ Polycythemia rubra vera
5. ☐ Right ventricular failure

INCORRECT ☐**The correct answer is 1.**

The patient has superior vena cava syndrome, which is most commonly secondary to extension of a primary lung cancer (usually a small-cell carcinoma) into the neck, with obstruction of superior vena caval blood flow. Clinical findings consist of puffiness and bluish discoloration of the face, arms, and shoulders, along with distention of the jugular veins. Collateral venous circulation results, as evidenced by dilated and tortuous veins over the anterior chest. In addition, there are central nervous system signs of dizziness, visual disturbances, and convulsions. Prompt administration of diuretics, fluid restriction, and radiation therapy are useful in restoring blood flow. Surgery is rarely indicated. The mean survival is 6–8 months.

**(Choice 2)** distends the neck veins but would not be associated with the degree of venous engorgement noted in this case.

**(Choice 3)** is uncommon and usually results from histoplasmosis.

**(Choice 4)** is associated with increased plasma volume and red blood cell mass, and a tendency for venous thrombosis. However, thrombosis of the superior vena cava is very unlikely.

**(Choice 5)** is not associated with the degree of venous engorgement noted in this patient.

## 70. Question

1 points

## Category: Surgery



A 67-year-old man consults his physician because of difficulties while urinating. His major concern is that he has trouble completely emptying his bladder and that after concluding the act, urine sometimes dribbles across the head of his penis, irritating the skin. When asked, he admits that the flow is weaker and slower than it had been and that sometimes it is interrupted. Moreover, he is often awakened during the night by an overpowering urge to urinate. Otherwise, he is healthy. A physical examination was unremarkable, except for findings on a digital rectal examination. This revealed a nontender, smooth but enlarged prostate gland that felt firm but not hard. Routine laboratory workup showed no abnormalities. The prostate-specific antigen (PSA) level was 3.5 ng/dL. Among the following alternatives, which is the best initial treatment to prescribe for this patient?

1. ☐ Transurethral resection of the prostate
2. ☐ Trimethoprim-sulfamethizole
3. ☐ Finasteride ☒
4. ☐ Radical prostatectomy
5. ☐ Interstitial radiotherapy

**INCORRECT** ☐

**The correct answer is 3.**

The symptoms described in the case history clearly suggest a diagnosis of benign prostatic hypertrophy (BPH) since his PSA level is 3.5 ng/dl, below the 4.0 ng/dl level considered to be non malignant. Normally, the prostate is a walnut-sized gland situated just below the bladder and is wrapped around the urethra. With age, it tends to enlarge and constrict the urethra, making urination more difficult. BPH affects about 50% of men in their 50s and as many as 80% after the age of 70 years. Initially only a nuisance, if left untreated too long, BPH can become a serious medical problem: non-voided urine can lead to infection, and relentless back pressure can irreversibly damage bladder muscles and even the kidney. Normally, the first line of treatment is medical. Finasteride has proved to effectively reduce prostate size by as much as 20% and to effectively relieve mild to moderate symptoms over the long term, with few adverse effects. It is an inhibitor of 5 $\alpha$ -reductase, the enzyme that converts testosterone to its more active derivative dihydrotestosterone, the hormone that promotes the abnormal growth of the prostate, causing BPH. The major shortcoming of finasteride is that it takes up to a year to become fully effective. As a consequence, a selective  $\alpha_1$ -blocker such as doxazosin, terazosin, or prazosin often is also prescribed. The  $\alpha_1$ -blocker acts more rapidly to relax prostatic smooth muscle tone, resulting in reduction of urethral resistance and permitting urine to flow more freely. Thus, the two classes of drugs act synergistically short term; however, it is not clear if that is also true long term.

**(Choice 1)** Transurethral resection of the prostate (TURP) remains the gold standard for treatment for BPH, against which other treatments are compared. It is relatively safe and effective about 80% of the time; however, as with any surgical procedure, complications, sometimes severe, may arise, and some patients are left with urinary incontinence and/or

impotence, and a smaller fraction with infection and other more serious problems. Therefore, it is not usually the first line of treatment and is generally reserved for cases more severe than the one described, such as chronic cases, and cases in which medical treatment is ruled out or has proved ineffective.

**(Choice 2)** Trimethoprim-sulfamethizole (TMP-SMX) is one of the several antibiotics that might be used to treat prostatitis. It has no role in treating BPH unless a secondary infection has set in.

**(Choices 4 & 5)** Radical prostatectomy, interstitial radiotherapy, or external beam radiotherapy are three of the more common therapies used to treat prostatic cancer. Prostate carcinoma is the most common malignancy in males. The prevalence is estimated to be 30% for men in their 60s, close to 70% for those in their 80s, and approaching 100% for men in their 90s. However, because it often is slow growing, older men often die from causes other than problems arising from prostatic carcinoma. Early symptoms of BPH and prostatic cancer are similar. However, the digital rectal examination can often help distinguish between the two, since the cancerous prostate tends to be hard and nodular, not smooth and firm as in BPH. Although both conditions tend to elevate the PSA, the value in cancer is often above 10 ng/dL. Unfortunately, PSA values for both BPH and cancer can sometimes fall into a gray area, between 4 and 10 ng/dL, adding possible ambiguity to the diagnosis. The ultimate confirmatory test is biopsy.

## 71. Question

1 points

### Category: Surgery

A 51-year-old male with a history of alcoholic pancreatitis presented to the hospital because of sudden onset severe retrosternal and upper abdominal pain. He has been vomiting for the past few hours after consuming alcohol. His temperature is 38.1 °C (100.9 °F), blood pressure is 140/90 mm Hg, pulse is 120/min and respirations are 30/min. Examination shows palpable crepitus in the suprasternal notch. Lungs are clear to auscultation. The abdomen is tender to palpation mostly in the epigastrium. Which of the following is the most likely cause of his current condition?

1. ☐ Spontaneous pneumothorax
2. ☐ Acute pancreatitis
3. ☐ Perforated duodenal ulcer
4. ☐ Esophageal perforation ☐
5. ☐ Mallory-Weiss tear

INCORRECT ☐

**The correct answer is 4.**

The constellation of clinical findings in this patient is most consistent with esophageal perforation. First, the patient has chronic pancreatitis resulting from alcohol abuse. Exacerbations of chronic pancreatitis are frequently precipitated by alcohol consumption; such patients should be admonished to never consume alcohol. Exacerbation of the chronic pancreatitis has caused epigastric pain and tenderness as well as vomiting. Spontaneous rupture of the esophagus (Boorhave syndrome) can occur during episodes of vomiting, particularly when the patient is resisting the vomiting reflex. This results because high intraabdominal pressures are transmitted into the mediastinal esophagus where the transmural difference in pressure is large due to negative intrathoracic pressure. Esophageal rupture in this setting typically occurs a few centimeters above the gastroesophageal junction. The retrosternal pain and crepitus in the suprasternal notch are the result of pneumomediastinum, which commonly occurs following rupture of the esophagus within the mediastinum.

**(Choice 1)** Pneumomediastinum may accompany a pneumothorax, but pneumothorax would have decreased or absent breath sounds on the affected side.

**(Choice 2)** Acute pancreatitis causes epigastric pain radiating to the back but would not directly result in pneumomediastinum. It may, however, cause a left pleural effusion.

**(Choice 3)** A perforated duodenal ulcer would cause epigastric pain, and air would be visualized under the diaphragm on upright abdominal X-ray, but pneumomediastinum is not associated with duodenal perforation.

**(Choice 5)** A Mallory-Weiss tear is an incomplete mucosal tear at the gastroesophageal junction usually resulting from protracted vomiting. The common presentation is self-limited hematemesis. Pneumomediastinum does not occur in such tears because the rupture is incomplete.

72. Question

1 points

**Category: Surgery**

A 23-year-old man is brought to the emergency department after being hit in the neck with a dull instrument. He has neck pain and stiffness. Vital signs are stable. Neurological examination shows no abnormalities. An astute medicine resident decides to order an angiogram of the neck vessels to rule out carotid artery injury. Diagnostic angiography shows an intimal flap in the left internal carotid artery just above the carotid bifurcation. Which of the following is the most appropriate next step in management?

1. ☐ Neck exploration and repair ☐
2. ☐ Observation
3. ☐ Heparin
4. ☐ Aspirin

5. ☐ Ligation of carotid artery

**INCORRECT** ☐

**The correct answer is 1.**

Angiograms are done following neck trauma to rule out carotid artery injury. Angiograms are usually done for penetrating injury. Angiograms will evaluate the aortic arch and its branches. In the above patient, there is an intimal flap. Despite the patient being neurologically intact, exploration is mandatory, to prevent a stroke. The intimal flap may progress to complete obstruction of the vessel or may lead to emboli and stroke.

**(Choice 2)** Observation is not prudent in a vessel, which has an intimal flap. Observation may be indicated if the patient already has had a stroke and is in a poor condition to undergo surgery.

**(Choice 3)** Heparin is used as an anticoagulant if there is a thrombus or dissection of the carotid artery. It does not prevent thrombus formation in an intimal flap. The intimal flap may even get larger and completely obstruct the lumen of the vessel, causing a devastating stroke.

**(Choice 4)** Aspirin is indicated as a prophylactic agent to prevent thrombus formation in the carotid artery. Once an intimal flap has occurred, use of aspirin does not guarantee a stroke.

**(Choice 5)** Ligation of the carotid artery is done only if there is uncontrolled hemorrhage from the vessel. Ligation may be done if the vessel is completely occluded. It is not recommended to ligate carotid artery in a dissection; it may produce an acute stroke.

73. Question

1 points

**Category: Surgery**

A 24-year-old woman is brought to the emergency department after being stabbed by her boyfriend. The examining physician notes a 1.5-cm puncture wound lateral to her sternum. She has a blood pressure of 70/palpable, distended neck veins, and muffled heart sounds. Which of the following is the most appropriate next step in management?

1. ☐ Cardiac surgery consult
2. ☐ Echocardiogram
3. ☐ Chest x-ray film
4. ☐ Chest tube placement
5. ☐ Pericardiocentesis ☐

**INCORRECT** ☐

**The correct answer is 5.**

The woman was stabbed in the heart, leading to cardiac tamponade (blood collecting in the pericardial sac). This causes impairment in heart function, leading to hypotension, distension of neck veins due to pump failure, and muffled heart sounds due to the collection of blood. The immediate concern is removing the blood from the pericardial sac by performing pericardiocentesis. All the other tests would lead to unnecessary delays in diagnosis and would result in death.

**(Choice 1)** is necessary for this patient to ultimately repair the damaged heart; however, the first step in saving this woman before the specialist arrives is pericardiocentesis.

**(Choice 2)** could aid in the diagnosis of pericardial effusion but would take too long to administer in such an emergent situation.

**(Choice 3)** would show a pericardial effusion, but there already are enough data to support the diagnosis, so x-ray would cause unnecessary delay in therapy.

**(Choice 4)** is used for pneumothorax and pleural effusions but would not be effective in the present scenario.

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#### 74. Question

**1 points**

##### **Category: Surgery**

A 30-year-old man comes to the physician because of a 2-week history of swelling and pain in the right knee. He first experienced pain when he twisted his leg while playing football 15 days ago. He felt something 'popping' in the knee at that time but ignored it. The pain and swelling has been increasing since, and he feels sudden pain with extension of his leg. Examination shows the right knee is swollen and tender along the medial side. Full extension of the right knee is not possible due to sudden pain during terminal extension. Snapping can be felt in the right knee on tibial torsion with the knee flexed at 90 degrees. An x-ray film of the knee joint shows no abnormalities. Which of the following is the most likely diagnosis?

1. ☐ Anterior cruciate ligament injury
2. ☐ Posterior cruciate ligament injury
3. ☐ Medial meniscus tear ☐
4. ☐ Medial collateral ligament tear
5. ☐ Lateral collateral ligament tear

**INCORRECT** ☐

**The correct answer is 3.**

The patient described most likely has suffered a tear of the medial meniscus. Meniscal injuries often result from twisting injuries with the foot fixed. The medial meniscus is more commonly injured than the lateral meniscus. Patients generally complain of a popping sound followed by severe pain at the time of injury. Because the meniscus is not directly perfused, effusion following injury typically is not clinically apparent for many hours following the injury. Examination reveals localized tenderness on the medial side of the knee. Locking of the knee joint on extension is generally seen in “bucket handle” tears, while range of motion at the knee is limited by pain in all meniscal tears. McMurray’s sign, which is indicative of a medial meniscus tear, refers to a palpable or audible snap occurring while slowly extending the leg at the knee from full flexion while simultaneously applying tibial torsion.

**(Choice 1)** In cases of anterior cruciate ligament tear, the patient gives a history of a forceful hyperextension injury to knee or a noncontact torsional injury of the knee during deceleration. Effusion is seen rapidly following injury. Lachman’s test, anterior drawer test and pivot shift test are used for clinical diagnosis.

**(Choice 2)** Posterior cruciate ligament injury is classically seen in the “dashboard injury”, which refers to forceful posterior-directed force on the tibia with the knee flexed at 90 degrees. The posterior drawer, reverse pivot shift and posterior sag tests will help in clinical diagnosis.

**(Choice 4)** Medial collateral ligament injury is associated with abduction injury to the knee. The valgus stress test will help in clinical diagnosis of this condition.

**(Choice 5)** Lateral collateral ligament injury is very rare and would be seen in adduction injury to the knee. The varus stress test will help in clinical diagnosis of these patients.

75. Question

1 points

**Category: Surgery**

A 67-year-old woman of Asian descent presents at the emergency room at 9 PM complaining of an extremely severe right frontal headache. The pain started while she was at the movies, watching the second film of a double feature program. The pain forced her to leave the movie theater, and her husband had to drive her to the emergency room because in addition to her very severe headache, she saw halos around all of the streetlights and headlights of oncoming traffic. During the drive, she suffered from severe nausea and tried to vomit twice, but “nothing came up.” On physical examination, her right eye is red and tearing, the cornea has a greenish, steamy look, and the right pupil is fixed in mid-dilation. She has decreased vision in that eye, and when she is questioned about it, she admits that it is her eye, not her head, that hurts terribly. Palpation suggests that the right eye is “hard as a rock.” Which of the following should be started as emergency treatment while awaiting ophthalmologic consultation?

1. ☐ Copious irrigation of the eye with sterile saline
2. ☐ Intravenous carbonic anhydrase inhibitor ☐



3. ☐ Ophthalmologic atropine drops
4. ☐ Topical antihistamines or mast cell inhibitors
5. ☐ Topical corticosteroid-antibiotic combination

**INCORRECT** ☐

**The correct answer is 2.**

The clinical picture is that of acute-angle closure glaucoma. Treatment is urgent and consists of oral or intravenous carbonic anhydrase inhibitors, topical beta-blockers, and alpha-2-selective adrenergic agonists. Osmotic diuretics may also be needed, and the definitive treatment is laser peripheral iridotomy.

**(Choice 1)** Copious irrigation is the emergency treatment for caustic burns of the eyes. It would not help in this case.

**(Choice 3)** Atropine drops would lead to mydriasis, which, as a rule, impedes, rather than enhances, aqueous outflow. The patient needs aqueous production to be diminished (which the carbonic anhydrase inhibitors do) and outflow to be improved.

**(Choices 4 & 5)** Topical antihistamines or mast cell inhibitors and topical corticosteroid-antibiotics are indicated in other ophthalmologic conditions, not in the treatment of glaucoma.

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## 76. Question

1 points

### Category: Surgery

A 68-year-old man presents at the emergency department because of such severe abdominal pain that he “just could not stand it any longer.” He tells the triage nurse that he hadn’t been feeling well for the past couple of months, primarily because he had been having abdominal pain about 30 minutes after eating and as a consequence lost almost 10 pounds, but last night he suddenly developed “a stomach ache from hell.” He also has been vomiting and has had several episodes of bloody diarrhea. Upon physical examination, the physician notes hypotension and confirms the abdominal pain and notices abdominal distention. However, bowel sounds are absent, and there is no rebound tenderness present or other relevant findings upon abdominal examination. Laboratory data reveal an absolute neutrophilic leukocytosis and left shift plus lactic acidosis, and elevation of the serum amylase level. Which of the following is the most likely diagnosis?

1. ☐ Acute ulcerative colitis
2. ☐ Hemorrhagic pancreatitis
3. ☐ Aortoenteric fistula
4. ☐ Acute small bowel infarction ☐
5. ☐ Toxic megacolon

**INCORRECT** ☐

**The correct answer is 4.**

Acute small bowel infarction is indicated by the sudden onset of severe abdominal pain with vomiting and abdominal distention out of proportion with the physical findings, absent bowel sounds, a striking neutrophilic leukocytosis with left shift, lactic acidosis, hypotension, and increased serum amylase concentration of bowel origin. The increased serum amylase concentration is sometimes misinterpreted as representing acute hemorrhagic pancreatitis. Barium studies reveal "thumbprinting" of the mucosa due to submucosal hemorrhages and edema. Peritoneal signs (e.g., rebound tenderness) are generally late findings. These signs of acute infarction are often preceded by abdominal angina (also known as, mesenteric angina) 30 minutes after eating. Because of the pain, patients tend to have a fear of eating, and they lose weight. In 50% of cases, acute small bowel infarction occurs in elderly patients with atherosclerotic disease; usually, the pathogenesis relates to sudden occlusion of the superior mesenteric artery by thrombosis over an atherosclerotic plaque, less often to an embolism from the left heart (mitral valve disease, atrial fibrillation, or left ventricular mural thrombosis), and rarely from vasculitis. In about 25% of cases, nonocclusive infarction can occur from a low rate of blood flow, as in vasospasm or shock. Causes of vasospasm include ergot or cocaine poisoning and sympathomimetic drugs, such as digitalis. Shock can be induced by hypovolemia and hypotension, as may be caused by cardiac failure or loss of blood, as would occur with aortic aneurysm repair or dissections of the aorta (uncommon). The remaining 25% of cases of small bowel infarction may result from superior mesenteric vein occlusion related to hypercoagulable states, which could be associated with polycythemia rubra vera, oral contraceptives in females, malignancy, or one of the hereditary hypercoagulable states (e.g., antithrombin III deficiency, protein C and S deficiencies). Whatever the underlying mechanism, transmural, hemorrhagic infarctions damage the integrity of the mucosa, thus predisposing the bowel to secondary bacterial penetration and generalized peritonitis. The reestablishment of blood flow frequently results in further damage due to re-availability of oxygen, which may cause free radical formation. Treatment of the ischemic bowel must occur within 12 hours; otherwise, a 100% mortality rate can be expected. Surgery is always indicated if a grossly obvious hemorrhagic infarction has already occurred. Visible peristalsis is the best way to determine if the bowel is viable or dead. Embolectomy and intraarterial vasodilators are also used, depending on the cause of the ischemia.

**(Choice 1)** The symptoms presented in this case are unlikely clinical presentations for acute ulcerative colitis; moreover, ulcerative colitis is most often seen in young adults.

**(Choice 2)** Although hemorrhagic pancreatitis involves an elevated serum amylase concentration, it is not associated with diffuse abdominal pain and bloody diarrhea.

**(Choice 3)** An aortoenteric fistula is usually a late complication of repair of an abdominal aortic aneurysm.

**(Choice 5)** Toxic megacolon is associated with ulcerative colitis.

## 77. Question

1 points

## Category: Surgery

A 27-year-old man is shot point blank with a .22-caliber revolver. The entrance wound is in the anterior chest wall, just to the left of the sternal border, at the level of the 4th intercostal space. There is no exit wound. He is diaphoretic, cold, shivering, and anxious, and is asking for a blanket and a drink of water. His blood pressure is 65/40 mm Hg, and his pulse is 145/min and barely perceptible. He has large, distended veins in his neck and forehead. He is breathing adequately and has bilateral breath sounds. He is neurologically intact. Which of the following is the most likely diagnosis?

1. ☐ Extrinsic cardiogenic shock due to pericardial tamponade ☐
2. ☐ Extrinsic cardiogenic shock due to tension pneumothorax
3. ☐ Hemorrhagic shock
4. ☐ Intrinsic cardiogenic shock due to myocardial damage
5. ☐ Vasomotor shock

INCORRECT ☐**The correct answer is 1.**

It is obvious that the patient is in shock, and the distended veins identify the type as cardiogenic. Given the location of the injury, pericardial tamponade is the obvious mechanism. Other possibilities are excluded as noted below.

**(Choice 2)** Tension pneumothorax is another form of extrinsic cardiogenic shock that can be seen with penetrating injuries of the chest. However, there would be respiratory distress and absent breath sounds on the affected hemithorax.

**(Choice 3)** Hemorrhagic shock is by far the most common reason for shock in the trauma victim, and thus it always has to be a consideration. However, his veins would have been empty rather than bulging.

**(Choice 4)** Intrinsic cardiogenic shock is seen with massive myocardial infarctions or fulminating myocarditis. The large distended veins would be there, but the setting would not be that of a penetrating injury.

**(Choice 5)** Vasomotor shock should not be overlooked, since a high spinal cord transection can produce it. But the patient would be pink and warm rather than pale and cold. Furthermore, this patient was neurologically intact.

## 78. Question

1 points

## Category: Surgery

A 46-year-old male was admitted with epigastric pain radiating to the back. He has a previous history of endocarditis from intravenous drug use and cellulitis of the arm. Serum lipase is elevated. He was admitted and treated conservatively. Two days later he started to have a fever. He is awake but slightly disoriented. His temperature is 38.7 deg;C (101.6 deg;F), blood pressure is 120/76 mm Hg, pulse is 110/min and respirations are 16/min. He is tremulous and says bugs are crawling on him. His blood cultures are positive for gram negative rods. Empiric antibiotic therapy is started. CT scan of the abdomen shows a new 6 x 6 cm cystic lesion attached to the pancreatic head. Laboratory results show:

**Hematocrit:** 44.0 g/L

**MCV:** 105fl

**Leukocyte count:** 18,500/mm<sup>3</sup>

**Amylase:** 255 U/L

Which of the following is the most appropriate next step in management?

1. ☐ External drainage of the cystic lesion ☐
2. ☐ Continue conservative management
3. ☐ Obtain echocardiogram to evaluate for endocarditis
4. ☐ Obtain Ca 19-9 level for pancreatic cancer
5. ☐ Perform lumbar puncture to rule out meningitis

**INCORRECT** ☐

**The correct answer is 1.**

This patient initially was admitted for acute pancreatitis. The patient is usually afebrile in uncomplicated pancreatitis. Alcohol abuse and gallstones account for over 80% of cases of pancreatitis; this patient likely abuses alcohol given his social history, his elevated MCV and his withdrawal-like tremulousness and formication. A well-known complication of acute pancreatitis is pseudocyst formation. Pancreatic pseudocysts are defined as collections of pancreatic secretions within a fibrous capsule, usually within the pancreas. Pseudocysts are typically diagnosed when a patient with acute pancreatitis fails to improve clinically with standard supportive care. Pseudocysts may uncommonly become infected resulting in a pancreatic abscess. Pancreatic abscess is typically accompanied by fever and leukocytosis and may result in bacteremia, as described in this patient. Treatment includes antibiotics and drainage of the abscess.

**(Choice 2)** Conservative management is indicated for uncomplicated pseudocysts.

Pseudocysts may be complicated by infection, rupture or hemorrhage; these complications require intervention.

**(Choice 3)** Infective endocarditis in an intravenous drug abuser most commonly results from *S. aureus* colonization of the right heart valves. This is not the most likely cause of this patient's bacteremia, so an echocardiogram is not indicated at this time.

**(Choice 4)** Pancreatic cancer is not a likely cause of the patient's acute issues. CA 19-9 levels are not indicated in the acute management of this patient.

**(Choice 5)** His disorientation, tremor and hallucinations are probably due to alcohol withdrawal. There is no need for lumbar puncture at this time.

79. Question

1 points

**Category: Medicine**

A patient involved in a high-speed automobile collision arrives in the emergency department unconscious, with multiple facial fractures; brisk bleeding into his nose, mouth, and throat; and gurgly, irregular, noisy breathing. Which of the following would be the best method to secure an airway in this patient?

1. ☐ Nasotracheal intubation with visualization of the cords
2. ☐ Orotracheal intubation with rapid anesthetic induction
3. ☐ Percutaneous transtracheal ventilation
4. ☐ Cricothyroidotomy done in the emergency department ☐
5. ☐ Emergency tracheostomy done in the emergency department

**INCORRECT** ☐

**The correct answer is 4.**

The profuse bleeding into the upper airway makes any approach through the mouth or nose doomed to failure, and will likely worsen the existing injuries. A direct route to the airway lower in the neck is needed, and the best option for quick use in the emergency department is a cricothyroidotomy.

**(Choice 1)** As pointed out above, attempted nasotracheal intubation would worsen existing nasal injuries, and visualization of the cords would not be possible with all the blood in the field.

**(Choice 2)** The same is true of orotracheal intubation: only blood would be seen as attempts are made to visualize the cords. Furthermore, rapid induction anesthesia would be quite redundant in an unconscious patient.

**(Choice 3)** Percutaneous transtracheal ventilation is the best alternate option but is not as good as the cricothyroidotomy. Contrary to what the name implies, one can oxygenate a patient through a small diameter catheter placed percutaneously into the trachea, but ventilation cannot be done very well by that route. In an unconscious patient, one may need better ventilation to help lower intracranial pressure.

**(Choice 5)** Emergency tracheostomy done in the emergency department is an absolute no-no. Tracheostomy is a formal operative procedure that should be done in the operating room, with all the help, light, instruments, and exposure appropriate for such an undertaking. To do so, an airway must have been previously secured in some other way. Attempting to operate in the neck without a secure airway, and in less than ideal conditions, can very quickly turn into a horror show.

80. Question

1 points

**Category: Surgery**

A 70-year-old woman was referred to an ophthalmologist by her primary care physician, whom she had been seeing for many years. Her complaint was that she had thought her vision was deteriorating. After his examination, the ophthalmologist determined she had an exudative form of age-related macular degeneration. He recommended laser photocoagulation. As a result of this treatment, the patient should expect which one of the following?

1. ☐ Improvement in visual acuity within a week following the procedure
2. ☐ Gradual improvement in visual acuity by the end of 6 months
3. ☐ No change in visual acuity
4. ☐ Worsening of visual acuity ☐
5. ☐ Loss of peripheral vision

**INCORRECT** ☐

**The correct answer is 4.**

The macula has the highest density of cones. Laser photocoagulation targeted at drusen may inadvertently damage cones. Unfortunately, this is not preventable. For this reason, it is important to advise the patient that deterioration in visual acuity would follow the procedure, and that the reason for recommending it is to slow progression of the disease, which if left unchecked, would soon leave her legally blind.

**(Choices 1,2 & 3)** are incorrect.

**(Choice 5)** is incorrect because peripheral vision remains relatively intact in macular degeneration, since drusen tiny, yellow or white hyaline bodies that are one of the most common precursor signs of age-related macular degeneration tend to accumulate in the macular area and a few are present elsewhere.



**Category: Surgery**

A 45-year-old man shows up in the emergency department with a pale, pulseless, paresthetic, painful, and paralytic right lower extremity. The process began suddenly 2 hours ago. On examination, no pulses are apparent in the right lower extremity. Pulse at the wrist is 95/min and grossly irregular. Treatment would likely be based on which of the following?

1. ☐ Dacron prosthetic vascular conduits
2. ☐ Fogarty balloon tipped catheters ☒
3. ☐ Heparin and dicumarol
4. ☐ Saphenous vein bypasses
5. ☐ Selective sympathetic blocks

**INCORRECT** ☒

**The correct answer is 2.**

The clinical picture is that of embolic occlusion of the right common iliac at the aortic bifurcation (or possibly a similar process at the bifurcation of the common iliac into internal and external branches). The source is also obvious in the vignette: atrial fibrillation (manifested by the grossly irregular pulse). He needs an emergency embolectomy, which is done with the balloon tipped catheters invented by Fogarty. If he had been ischemic for a longer period of time, he might have required a fasciotomy of the lower leg as well. Clot-busters were not offered as an option. They can be used in highly selected cases, but the question did not offer all the necessary details that would have enabled a very experienced vascular surgeon to choose this approach. Of the choices offered, only the embolectomy is correct.

**(Choice 1)** Dacron prosthetic vascular conduits are appropriate for cases of arteriosclerotic occlusive disease blocking the iliacs, in which the native vessel cannot be opened and a graft has to go from the aorta to the femorals.

**(Choice 3)** Anticoagulants are an adjunct to vascular procedures, but are not the primary treatment for a clot that has already traveled from the atrial appendage to the lower extremity. Anticoagulants cannot dissolve existing clots.

**(Choice 4)** Saphenous vein bypass is the preferred way to deal with chronically occluded common femoral arteries, but it is not a choice when the native vessel is fine and can be unplugged.

**(Choice 5)** Sympathetic blocks are rarely used in vascular surgery. They are more appropriate for functional problems than for mechanical obstructions.

**Category: Surgery**

A 42-year-old woman is brought to the emergency department after being involved in a motor vehicle collision. On arrival she is unconscious with bilaterally round and reactive pupils. Her temperature is 37 °C (98.6 °F), blood pressure is 70/20 mm Hg, pulse is 110/min and respirations are 22/min. There is a low jugular venous pulse. She does not respond to vocal commands but responds to pain with all 4 limbs. She is not vocalizing. Lung auscultation is unremarkable. Abdominal examination shows a distended abdomen with absent bowel sounds and some bruising. She is intubated and is rapidly infused with 2L of lactated Ringer's solution. Her blood pressure is now 80/30 mm Hg and her pulse is 118/min. Which of the following is the most appropriate next step in management?

1. ☐ X-ray of abdomen
2. ☐ CT scan of head
3. ☐ Exploratory laparotomy ☒
4. ☐ Lateral x-ray of spine
5. ☐ Chest x-ray

**INCORRECT** ☒

**The correct answer is 3.**

This is a patient of polytrauma with an abdominal injury and most likely a head injury. In trauma patients, immediate treatment must always include rigid fixation of the cervical spine and assessment of airway, breathing and circulation (the ABCs of the primary survey). The patient is tachypneic, tachycardic and hypotensive suggesting significant blood loss. The first step in the management of hypotension is rapid administration of intravenous isotonic fluids. The patient described has not responded adequately to fluid administration as she continues to have hypotension and tachycardia. This is suggestive of continuing bleeding and is an indication of surgical intervention. This patient's abdominal distention, absent bowel sounds and abdominal bruising suggest that the hemorrhage is most likely intraabdominal. Emergent exploratory laparotomy is indicated.

**(Choice 1)** X-ray of the abdomen is not a sensitive test for intraabdominal trauma. Delaying surgery for further diagnostic studies may lead to the patient's demise.

**(Choice 2)** Though the patient has a low Glasgow coma scale, intracranial bleeding can never cause enough blood loss to cause this degree of hypotension. Continued exsanguination and hypotension will cause death in this patient before head trauma would; therefore, treatment of the acute hemorrhage takes priority.

**(Choice 4)** Spine injury should be ruled out in patients with polytrauma but the first priority is to secure airway, breathing and circulation. The continued hemorrhage is a fault in circulation and must be addressed first. Rigid fixation of the cervical spine is done prophylactically as part of the primary survey.

**(Choice 5)** Delaying treatment of the patient's acute hemorrhage for a chest x-ray is inappropriate. Lung sounds were normal in the patient, so severe intrathoracic injury is less likely to be the cause of the patient's hemorrhage than abdominal injury.

### 83. Question

1 points

#### Category: Surgery

A 50-year-old female patient scheduled to be discharged from the hospital the next day is suffering from a unrelated 2-week history of extreme pain upon defecation. The patient denies any associated abdominal pain, nausea, vomiting, fever, or chills. She reports a long history of constipation, which has been severe lately. She has also noticed slight spotting of blood on tissue paper, but denies any anal drainage, bright red blood per rectum, or melena. On examination, what is the most likely physical finding in this patient?

1. ☐ Disruption of anoderm in the posterior midline. ☒
2. ☐ Protrusion of an internal hemorrhoid
3. ☐ Fistula in ano
4. ☐ Perirectal abscess
5. ☐ Anal condyloma

**INCORRECT** ☐

**The correct answer is 1.**

An anal fissure is a disruption of the anoderm. It most commonly occurs in the posterior midline as a result of forceful dilatation of the anal canal, most often during defecation. Initially it is felt as a tearing pain upon defecation. This pain causes the patient to ignore the urge to defecate, resulting in constipation and further disruption to the anoderm upon defecation. A cycle of pain, poor sphincteric relaxation, and reinjury occurs. The patient presents with pain upon defecation and minimal bleeding on tissue of stool. Physical exam by simply separating the buttocks will reveal a tear in the anoderm in the posterior midline.

**(Choice 2)** Protrusion of an internal hemorrhoid usually results in anal fullness and discomfort along with bright red blood per rectum. Occasionally, an internal hemorrhoid can prolapse through the anus and incarcerate, requiring surgical intervention. Hemorrhoids can usually be distinguished from a fissure on physical exam.

**(Choice 3)** A fistula in ano presents as a draining site on the buttock skin, usually as a complication of an anorectal abscess. It presents with drainage, not extreme pain.

**(Choice 4)** Perirectal and anorectal abscesses most often arise from obstruction of an anal gland that subsequently becomes infected and overgrown with bacteria. These glands are located between the internal and external anal sphincters. If the infection tracks down this space toward the skin, an anorectal abscess occurs.

**(Choice 5)** Anal condylomas are caused by infection with human papillomavirus (HPV) types 6 and 11. Patients complain of a perianal growth that appears as a cauliflower-like lesion on physical exam. Minimal disease may be treated in the office with bichloroacetic acid or podophyllum. Larger lesions may require surgical excision.

#### 84. Question

1 points

##### Category: Surgery

A 31-year-old accounting student presents with a persistent headache that began approximately 4 months ago. The headache has been gradually increasing in intensity, and is worse in the mornings. Thinking that she might need new glasses, she sought help from her optometrist, who discovered that she has bilateral papilledema and sent her in for medical evaluation. On direct questioning, she admits to repeated vomiting for the past 3 weeks, with no heaving, straining, or preceding nausea. "I would just open my mouth, and the stuff would hit the wall," she explains. She denies any other neurological symptoms. Which of the following is the most likely diagnosis?

1. ☐ Brain abscess
2. ☐ Brain tumor ☐
3. ☐ Chronic subdural hematoma
4. ☐ Multiple sclerosis
5. ☐ Subarachnoid bleeding

**INCORRECT** ☐

**The correct answer is 2.**

Progressive headache that is worse in the mornings and present for several months indicates a brain tumor. Furthermore, the papilledema and projectile vomiting leave no doubt about the presence of increased intracranial pressure, something that a brain tumor eventually will produce. Do not be fooled by the absence of other neurologic symptoms; that can happen when tumors press on a "silent area" of the brain.

**(Choice 1)** is also an intracranial mass that can do the same things described here, but the timetable would be shorter (days or weeks) and the source of infection would be described in the vignette (mastoiditis or frontal sinusitis, for instance).

**(Choice 3)** affects very old or alcoholic patients, who gradually lose their mental capacity after trivial trauma to the head.

**(Choice 4)** Degenerative diseases, like multiple sclerosis, typically have on and off neurologic deficits for years before they are diagnosed.

**(Choice 5)** Subarachnoid bleeding from an intracranial aneurysm can indeed strike a young person, but the presentation is an extremely intense headache of sudden onset, “like a thunderclap.”

85. Question

1 points

**Category: Surgery**

A 32-year-old female presents with intermittent blood staining of her bra from her left breast. She has not felt any lumps on either breast. Physical examination shows no breast mass or axillary lymphadenopathy. Ultrasonogram of the breast is within normal limits. Which of the following is the most likely diagnosis?

1. ☐ Fibrocystic changes
2. ☐ Fibroadenoma
3. ☐ Intraductal papilloma ☒
4. ☐ Ductal carcinoma in situ
5. ☐ Hyperprolactinemia

**INCORRECT** ☐

**The correct answer is 3.**

This woman’s history is most consistent with a diagnosis of intraductal papilloma, a form of benign breast disease that is most common in perimenopausal women. The classic presentation is intermittent bloody discharge from one nipple. Most intraductal papillomas are situated beneath the areola, and are difficult to palpate on physical exam due to their small size (no larger than 2 mm) and soft consistency. Ultrasound is best at detecting masses greater than 1 cm in diameter; therefore, it is no surprise that the ultrasound finding was normal in this patient.

**(Choice 1)** Fibrocystic changes are also very common in premenopausal females. Patients present with bilateral breast pain associated with cystic changes of the breasts. The condition is benign, and symptoms vary cyclically with the menstrual cycle. On physical exam, lumpiness of the breasts is appreciated.

**(Choice 2)** A fibroadenoma is a solitary breast lesion, which presents as a painless, firm, and mobile breast lump, averaging about 2 cm in size. It occurs most often in women ages 15-25, and the condition is benign. Fibroadenomas do not change with the menstrual cycle.

**(Choice 4)** Ductal carcinoma in situ is most common in postmenopausal women. It is usually discovered as an incidental finding on mammography. In cases that do present symptomatically, nipple discharge and breast mass are the most frequent complaints. It is a histologic diagnosis, involving cellular abnormalities of the ductal epithelium that do not penetrate the basement membrane.

**(Choice 5)** Hyperprolactinemia can cause galactorrhea, but does not cause unilateral bloody nipple discharge.

86. Question

1 points

**Category: Surgery**

A 55-year-old man presented to his family physician with a history of tiredness, aching, tingling, and cramps in his left leg. These symptoms got progressively worse toward the end of the day, but elevating the leg relieved them. The problem has become worse over the last several weeks, and he is now unable to walk a city block without extreme pain, which lingers even after he sits down and rests for a few minutes. He has tried over-the-counter analgesics, which have given him temporary relief. The patient has noticed that his foot is swollen by the end of the day, when he has to loosen the shoelace to feel comfortable. He is a factory worker and must stand for long hours at his job. Physical examination revealed soft-tissue swelling of the left ankle. A reddish brown discoloration of the skin was noted behind the medial malleolus of the left ankle, together with a small area of ulceration in the center. No calf tenderness was elicited, but he did have some scattered areas of venous dilatation under the skin of the leg. No abnormality was noted in the right leg. The femoral, popliteal, and dorsalis pedis pulses were normal and equal in both lower extremities. The most likely condition this patient is suffering from is which one of the following?

1. ☐ Superficial thrombophlebitis
2. ☐ Embolic disease
3. ☐ Arterial insufficiency
4. ☐ Immune vasculitis
5. ☐ Deep venous insufficiency ☐

**INCORRECT** ☐

**The correct answer is 5.**

The patient has deep venous insufficiency, as indicated by the history of venous symptoms stated in the vignette, including stasis dermatitis and superficial varicosities. Stasis dermatitis is a rusty discoloration of the skin, with or without ulceration, which usually is located behind the medial malleolus. Venous blood from the skin and superficial tissues that lie external to the deep fascia of the leg drains via perforators (communicating veins), into the deep veins in



the calf and is then returned to the right atrium. When the calf muscles contract, valves prevent retrograde flow into the superficial system. Incompetence of the venous valves leads to retrograde flow, increased venous pressure in the dorsal vein of the foot, and ensuing changes to the skin around the ankle. Persistently elevated venous pressure leads to capillary leakage. As a result, blood and fibrin is deposited in surrounding tissues. Breakdown of blood into hemosiderin leads to pigmentation of the skin, while fibrin deposition around capillaries leads to the formation of a barrier. Ischemia predisposes to ulceration of the skin. Finally, the retrograde blood flow from the deep to the superficial venous system causes varicosities as well.

**(Choice 1)** is incorrect; superficial thrombophlebitis presents with pain and erythema along the course of the superficial saphenous vein. Fever may be present. It is not associated with stasis dermatitis. Superficial thrombophlebitis may occur spontaneously in polycythemia or polyarthritis, or may herald the presence of a visceral tumor, such as carcinoma of the pancreas. The condition is known as thrombophlebitis migrans.

**(Choice 2)** is incorrect; in embolic disease, the history would suggest an embolus to the lungs and physical findings suggestive of deep venous thrombosis. Deep vein thrombosis may be asymptomatic, presenting as pulmonary embolus, or it may be symptomatic. In the latter case, the patient will have low-grade fever, pain, swelling, redness, and dilated superficial veins. Stasis dermatitis is not a feature.

**(Choice 3)** is incorrect; arterial insufficiency is not associated with stasis dermatitis. However, varicose veins may coexist in patients with arterial insufficiency. The presence of normal arterial pulses and the lack of claudication pain that is characteristic of arterial insufficiency rules out this diagnosis.

**(Choice 4)** is incorrect; rheumatoid arthritis is three times more common in women than in men. Rheumatoid arthritis may be associated with vasculitis. However, varicosities, or stasis dermatitis, are absent. Furthermore, the patient would have evidence of joint involvement, which is absent in the case described.

## 87. Question

1 points

### Category: Surgery

A 14-year-old boy presents in the emergency department with very severe pain of sudden onset in his right testicle. There is no history of either trauma or recent mumps. He is afebrile, and a urinalysis shows no pyuria. The testis is swollen, exquisitely painful, high in the scrotum, and riding in a horizontal position. The cord above the testis is not tender. Which of the following is the most appropriate next step in management?

1. ☐ Ice packs, analgesics, and careful observation
2. ☐ Sonogram of the testicle
3. ☐ IV antibiotics

- 4. ☐ Testicular biopsy
- 5. ☐ Emergency surgery ☐

**INCORRECT** ☐

**The correct answer is 5.**

The child has testicular torsion, one of the very few true urologic emergencies. He needs immediate de-torsion if the testis is to be saved. No time should be wasted doing further studies.

**(Choice 1)** Symptomatic care is fine for testicular trauma with scrotal hematomas. In this case, it would amount to malpractice.

**(Choice 2)** A sonogram is always done when the clinical diagnosis is epididymitis, and we want to be sure that torsion is not being overlooked. But when the clinical diagnosis screams "torsion:" as in this vignette, time wasted confirming the diagnosis with the sonogram could lead to loss of the testicle.

**(Choice 3)** Antibiotics are effective therapy for acute epididymitis, the condition with which testicular torsion may be confused. But the patient with epididymitis is usually somewhat older (sexually active) and has fever, pyuria, a very tender cord, and a normally positioned testicle.

**(Choice 4)** Testicular biopsy is done when we think that the diagnosis is cancer, but the scenario would be a painless mass in a young male.

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## 88. Question

**1 points**

### Category: Surgery

A 43-year-old mildly overweight female complains of periodic right knee swelling and pain with physical activity for the past three months. She says that this problem started while on a hiking trip three months ago, at which point she experienced a 'popping' sensation in her right knee. She recalls that her knee was swollen the next day, and responded to over-the-counter pain killers. Recently, she has had to limit her physical activities due to knee pain. On physical examination, there is tenderness of the anterior and medial right knee joint. Which of the following is the most likely diagnosis?

- 1. ☐ Anterior cruciate ligament tear
- 2. ☐ Meniscal tear ☐
- 3. ☐ Osteoarthritis
- 4. ☐ Patellar tendonitis
- 5. ☐ Anserine bursitis

**INCORRECT** ☐

**The correct answer is 2.**

Injury to a number of different structures within the knee, including ligaments and cartilaginous menisci, can cause a popping or snapping sensation. Damage to the medial meniscus is a common knee injury that presents as described above. Meniscal injuries occur most commonly in patients in their thirties and forties while performing activities requiring axial loading and rotation. Classically the patient will report feeling a “pop” that is followed by pain. Meniscal injuries typically cause joint swelling over the following 12 to 24 hours, in contrast to ligamentous injuries, which cause rapid joint swelling due to hemarthrosis. (Ligaments have much greater vascular supply than menisci, which rely on diffusion for nourishment.) Physical exam may show joint line tenderness, decreased range of motion and a positive McMurray’s test. MRI provides the definitive diagnosis.

**(Choice 1)** An anterior cruciate ligament (ACL) tear would cause immediate swelling due to rapid development of hemarthrosis. Moreover, patients typically experience immediate inability to weight-bear and then lasting knee instability following such an injury.

**(Choice 3)** Osteoarthritis has an onset that does not necessarily directly follow a distinct precipitating injury; instead it tends to develop insidiously over years. Osteoarthritis typically causes recurrent use-dependent swelling and pain as well as crepitus with range of motion on physical examination.

**(Choice 4)** Chronic overuse, typically related to strenuous athletic activities, can cause patellar tendonitis, or “jumper’s knee.” Physical exam typically reveals point tenderness over the proximal patellar tendon.

**(Choice 5)** The anserine bursa underlies the conjoined tendons of the gracilis and semitendinosus muscles and separates them from the head of the tibia. Anserine bursitis causes tenderness over the medial aspect of the knee, and typically affects athletes and obese middle-aged to elderly women. A popping sensation is not typically reported.

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89. Question

1 points

**Category: Surgery**

A 3-day-old male infant is transferred to the newborn intensive care unit from an outside facility with abdominal distention, bilious emesis, and failure to pass meconium. You evaluate the infant and, after obtaining a contrast enema, determine that he has meconium ileus. Which other condition is this child at risk for having?



1. ☐ Budd-Chiari syndrome
2. ☐ Down syndrome
3. ☐ Von Hippel-Lindau syndrome
4. ☐ Eaton-Lambert syndrome
5. ☐ Cystic fibrosis ☐

**INCORRECT** ☐

**The correct answer is 5.**

Meconium ileus is an obstruction of the distal ileum from inspissated meconium and is often associated with cystic fibrosis. Approximately 10% to 15% of infants with meconium ileus have cystic fibrosis. Meconium ileus presents with failure to pass meconium within 48 hours of birth in conjunction with progressive abdominal distention and bilious emesis. Abdominal films show the classic “soap bubble” appearance in the proximal colon, and a contrast enema shows a microcolon with small plugs of meconium (note the arrows in the image).



**(Choice 1)** Budd-Chiari syndrome is hepatic veno occlusive disease, mostly seen in adults and not associated with meconium ileus.

**(Choice 2)** Down syndrome (trisomy 21) is most often associated with cardiac and renal abnormalities. Associated abdominal abnormalities include imperforate anus, duodenal or jejunal atresia, duodenal or jejunal stenosis, and Hirschsprung's disease.

**(Choice 3)** Von Hippel-Lindau syndrome is associated with pancreatic, central nervous system, and renal tumors in adults.

**(Choice 4)** Eaton-Lambert syndrome is a paraneoplastic neurologic-myopathic syndrome that presents with symptoms similar to myasthenia gravis.

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## 90. Question

1 points

### Category: Surgery

A 25-year-old man comes to the physician because of a mass in his mouth. He has just noticed this mass and has had no trauma to his oral cavity. He does not use tobacco, alcohol or drugs. He has had no weight loss. Physical examination shows a large mass located on the hard palate of the mouth. On palpation, the mass is immobile, fleshy with bony surroundings and measures 3x 3 cm. Which of the following is the most appropriate next step in management?

1. ☐ Reassurance ☐
2. ☐ Biopsy
3. ☐ Surgery
4. ☐ Radiation
5. ☐ Antifungal treatment

**INCORRECT** ☐

**The correct answer is 1.**

Torus palatinus is a benign bony mass (exostosis) located on the hard palate. The growth of bone arises from the midline suture in the hard palate. A patient with torus palatinus will usually give a history that the lesion has been present for some time and will deny tenderness. The thin epithelium overlying the bony growth will tend to ulcerate and be slow to heal due to poor vascularity. No medical or surgical therapy is required unless the mass becomes symptomatic. The cause of this mass is unknown and is unrelated to trauma.

**(Choice 2)** Squamous cell carcinoma (SCC) is the most common malignancy of the head and neck. Oral SCC classically occurs in the setting of chronic alcohol or tobacco abuse or in cases of repeated oral trauma, such as may be caused by poorly fitting dentures. Inflammatory conditions such as oral lichen planus have also been associated with an increased risk of oral SCC.

**(Choice 3)** Surgical correction of torus palatinus is indicated only if the lesion causes symptoms or otherwise interferes with speech, eating or the fitting of dentures.

**(Choice 4)** Radiation therapy may be used as a primary or adjuvant therapy for many malignancies as well as for nonmalignant conditions, such as keloids. Torus palatinus is a benign growth and would not likely respond to radiation therapy.

**(Choice 5)** Candida infections do occur in the oral cavity but do not present as a hard mass. They are usually white and cheesy ("curd-like") in appearance and often lie on an erythematous base.

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91. Question

1 points

**Category: Surgery**

A 35-year-old black man is brought to the emergency department after a motorcycle accident. He hit the street with the side of his head. He was found unconscious when the emergency medical team arrived. However, on the way to the emergency department he regains consciousness. Upon arrival he is confused and complains of a headache. His temperature is 36.9 °C (98.5 °F), blood pressure is 100/60 mm Hg, pulse is 110/min, and respirations are 22/min. Examination shows a



dilated pupil on the right side, with some weakness of the left arm and leg. CT scan of the head shows a biconvex hematoma on the right side of the head. Which of the following is the most likely diagnosis?

1. ☐ Acute subdural hematoma
2. ☐ Acute epidural hematoma ☐
3. ☐ Basilar fracture of skull
4. ☐ Intracerebral bleeding
5. ☐ Subarachnoid hemorrhage

**INCORRECT** ☐

**The correct answer is 2.**

This patient has acute epidural hematoma. Epidural hematoma is accumulation of blood in the potential space between the cranium and dura mater. It may be intracranial or spinal. Acute epidural hematoma generally occurs with moderate degree of trauma to the side of the head. It results from rupture of middle meningeal artery secondary to temporal bone fracture. Acute epidural hematoma has a classic presentation of unconsciousness followed by a lucid interval (Patient is perfectly normal) followed by gradual deterioration of consciousness. The dilation of pupil on the side of lesion along with contra lateral hemiparesis is considered very characteristic. CT scan is the diagnostic test of choice and it shows a biconvex hematoma. Emergency craniotomy should be done to relieve the increased intracranial tension.

**(Choice 1)** Acute subdural hematoma is secondary to intracranial venous bleeding in the subdural space due to severe head trauma. The CT scan characteristically shows a semi lunar hematoma and there is no lucid interval.

**(Choice 3)** Basilar skull fracture does not cause lucid interval, biconvex hematoma or unilateral pupillary dilatation; it is characterized by raccoon eyes, rhinorrhea and otorrhea.

**(Choice 4)** Intracerebral hemorrhage is a grave emergency characterized by worsening coma and focal neurological signs. CT scan is diagnostic and it will not give lucid interval or biconvex hematoma. It is usually seen in elderly patients with hypertensive stroke.

**(Choice 5)** Subarachnoid hemorrhage is most commonly secondary to rupture of berry aneurism and characterized by severe headache and meningeal signs with or without focal signs. CT helps in diagnosis most of the times, but spinal fluid examination is diagnostic.

A 46-year-old man reports for a preemployment physical. He recently moved to California to take up employment as a research scientist at a prestigious university. He had had a distinguished career in biochemistry while he lived in Cleveland, Ohio, his place of birth. He did not smoke, drank wine on social occasions, never used recreational drugs, and had led a healthy lifestyle. He did not have a history of diabetes, hypertension, or coronary artery disease, nor did he have a history of chest pains, shortness of breath, cough, expectoration, or recent weight loss. He was not on any medications. There was no significant history of medical illness on either side of his family. Physical examination revealed a fit man, whose vital signs were normal. He had no pallor, icterus, or cyanosis. No clubbing of the fingers was noted. Cardiovascular examination revealed normal heart sounds, with sinus rhythm and no murmurs or carotid bruits. He did not have distended jugular veins. Examination of the respiratory system revealed a mild right shift of the trachea, good symmetric chest expansion, and absence of adventitious sounds. Examination of the abdomen was unremarkable, and a neurologic examination was normal as well. His Seibert purified protein derivative of tuberculin (PPD) test result was negative, and a routine chest radiograph revealed a 0.5 cm concentrically calcified coin lesion in the upper left lobe of the lung. Which of the following is the most likely cause of the lesion?

1. ☐ A primary lung cancer
2. ☐ A bronchial hamartoma
3. ☐ Metastatic cancer
4. ☐ A granuloma ☐
5. ☐ A calcified tuberculosis lesion

**INCORRECT** ☐

**The correct answer is 4.**

About 60% of the solitary coin lesions in the lung are benign. Of the benign causes, granulomas account for 95%, while the remaining 5% are due to hamartomas or mixed tumors. The patient's mid-western origins strongly suggest histoplasmosis as the cause for the calcified granuloma. Calcification of a coin lesion is more commonly seen in granulomas than in cancer. Absence of growth within 2 years noted on serial radiography of the chest, target or popcorn calcifications, or concentric calcifications strongly favors a benign process. A malignancy would be suggested by indistinct margins, increased growth rate compared with previous films, flecks of calcium in the mass, and sizes greater than 3 cm in diameter. A history of living in an endemic granuloma area and not smoking, in conjunction with no cough, chest pain, weight loss, rhonchi, or hemoptysis all suggest that the lesion is not cancer. Its benign nature also is strongly supported by the fact that it is concentric, calcified, and less than 1 cm in diameter. However, follow-up radiography should be conducted (first yearly, then less regularly) for at least 10 years to make sure the lesion is not growing. **(Choices 1,2,3 & 5)** Mixed tumors, also known as bronchial hamartomas **(Choice 2)**, are so called because they are pleomorphic and contain epithelial cells, cartilage, and mesenchymal cells. Malignant change is rare in them. Hamartomas are the result of faulty

development that results in tissue overgrowth. Indeed, the word hamartoma in Greek means fault and was the term used when spear throwers missed their mark. The remaining 40% of the causes of solitary coin lesions in the lung are primary lung cancer {35%; **(Choice 1)**} and metastatic lung cancer {5%; **(Choice 3)**}. A negative tuberculosis skin test result proves that it is not a calcified tuberculosis lesion **(Choice 5)**.

### 93. Question

1 points

#### Category: Surgery

A 75-year-old man slips and falls at home, hitting his right chest wall against the kitchen counter. He has an area of exquisite pain to direct palpation over the seventh rib, at the level of the anterior axillary line. A chest x-ray film confirms the presence of a rib fracture, with no other abnormal findings. Which of the following is the most appropriate initial step in management?

1. ☐ Supplemental oxygen to compensate for hypoventilation
2. ☐ Systemic narcotic analgesics
3. ☐ Binding of the chest to limit motion
4. ☐ Intercostal nerve block to minimize pain ☐
5. ☐ Open reduction and internal fixation to accelerate healing

**INCORRECT** ☐

**The correct answer is 4.**

A rib fracture can be a serious injury in the elderly, because the pain prevents full inspiration, atelectasis ensues, and eventually pneumonia develops and may cause significant morbidity and mortality. The key to the treatment is to eliminate the pain without interfering with ventilation. An intercostal nerve block will accomplish this goal.

**(Choice 1)** Although supplemental oxygen would not be directly injurious, it would neither eliminate the pain nor preserve ventilation.

**(Choice 2)** Systemic narcotic analgesics would diminish the pain but would also increase the probability of complications by depressing the respiratory drive, thus reducing ventilation.

**(Choice 3)** Binding the chest diminishes the pain by limiting motion. In doing so, however, it limits ventilation.

**(Choice 5)** Open reduction and internal fixation to accelerate healing is totally unnecessary. The chest wall already is holding the rib in a good position for eventual healing. It will not happen faster if we intervene.

## 94. Question

1 points

## Category: Surgery

A 72-year-old chronic smoker with severe chronic obstructive pulmonary disease (COPD) is found to have a central hilar mass on chest x-ray. Bronchoscopy and biopsies establish a diagnosis of squamous cell carcinoma of the lung. Pulmonary function studies show that he has an FEV1 of 1100 mL, and a ventilation-perfusion scan indicates that 60% of his pulmonary function comes from the affected lung. Which of the following is the most appropriate next step in management?

1. ☐ CT scan of the upper abdomen to rule out liver metastasis
2. ☐ Mediastinoscopy to biopsy carinal nodes
3. ☐ Radiation and chemotherapy ☐
4. ☐ Palliative pneumonectomy
5. ☐ Pneumonectomy with hope of cure

INCORRECT ☐**The correct answer is 3.**

This man is not a surgical candidate, thus ruling out pneumonectomy (choices 4 and 5). With a central lesion, he would require a pneumonectomy rather than a lobectomy. After resectional pulmonary surgery is done, however, a patient must be left with at least 800 mL in the FEV1 to live a semi-decent life. Anything less than that would make him a pulmonary cripple, or outright kill him. Because of his COPD, this patient is already severely limited, with a total FEV 1 of 1100 mL. Were the bad lung to be removed, he would be left with only 40% of 1100 mL: 440 mL. The only option left is radiation and chemotherapy.

**(Choices 1 & 2)** CT scan of the upper abdomen to rule out liver metastasis and mediastinoscopy to biopsy carinal nodes are necessary steps to establish curability. There is no point in doing a pneumonectomy if there are liver or carinal node metastases. But if a pneumonectomy cannot be done for reasons of poor function, there is no point in finding out whether the other limiting factors are present.

## 95. Question

1 points

## Category: Surgery

A 55-year-old obese female with a history of longstanding renal failure requiring dialysis is admitted to the ER with a clotted AV fistula. The patient has missed her regular dialysis and complains of fatigue, nausea, and feeling puffy. The patient's BP is 178/101, HR is 101, and RR is 22. Labs are

drawn and show K 6.8 mmol/L. The patient's EKG tracing shows peaked T waves with a prolonged PR interval and widening of the QRS complex. What is the initial step in the emergency treatment of hyperkalemia?

1. ☐ Calcium gluconate ☒
2. ☐ Metoprolol
3. ☐ Insulin and glucose
4. ☐ Dialysis
5. ☐ Albuterol

**INCORRECT** ☐

**The correct answer is 1.**

Hyperkalemia is seen in cases involving renal failure, crush injuries, burns, blood transfusions, and iatrogenic potassium containing infusions, and secondary to some medication use. Potassium is critical to the electric physiology of the heart, and hyperkalemia can result in ventricular fibrillation and cardiac arrest. EKG findings include peaked T waves, prolongation of the PR interval, and widening of the QRS complex. Levels exceeding 6.5 mmol/L are considered critical and should be immediately addressed. Immediate treatment includes cardiac stabilization by administration of IV calcium gluconate.

**(Choice 2)** Metoprolol is a  $\beta$ -antagonist and causes potassium to leave the cells and enter circulation, thereby causing hyperkalemia.

**(Choices 3 & 5)** Following administration of IV calcium gluconate, you must take action to reduce the serum concentration of potassium. These steps include shifting potassium into the cells with infusion of insulin and glucose or administration of an albuterol nebulizer, diuresis of potassium with furosemide, and binding of potassium in the intestinal tract with sodium polystyrene (Kayexalate), resulting in excretion.

**(Choice 4)** Dialysis can be used if the measures described in the explanation for 3 and 5 are ineffective or contraindicated.

96. Question

1 points

**Category: Surgery**

A 39-year-old paleontologist complains of right-sided hip pain that makes it very difficult for him to lay on his right side while sleeping. He localizes the pain to the outer surface of his thigh. Which of the following is the most likely cause of his pain?

1. ☐ Slipped femoral epiphysis

- 2. ☐ Paget's disease
- 3. ☐ Peripheral vascular disease
- 4. ☐ Trochanteric bursitis ☐
- 5. ☐ Hip osteoarthritis

**INCORRECT** ☐

**The correct answer is 4.**

The differential diagnosis for unilateral hip pain in a middle-aged adult is broad, and includes infection, trauma, arthritis, bursitis, and radiculopathy. This particular patient's presentation is most consistent with trochanteric bursitis. Trochanteric bursitis is inflammation of the bursa surrounding the insertion of the gluteus medius onto the femur's greater trochanter.

Excessive frictional forces secondary to overuse, trauma, joint crystals, or infection are responsible. Patients with this condition complain of hip pain when pressure is applied (as when sleeping) and with external rotation or resisted abduction.

**(Choice 1)** Slipped capital femoral epiphysis is a condition that primarily affects obese male children during late childhood or early adolescence.

**(Choice 2)** In Paget's disease of the bone (osteitis deformans), bone turnover is accelerated in localized areas resulting in focal bony hypertrophy. Affected bone is weak and prone to pathologic fractures. This condition tends to affect elderly patients and is asymptomatic in up to 75% of cases.

**(Choice 3)** Aortoiliac peripheral vascular disease may cause buttock, thigh, or hip pain and claudication. In men it may also cause erectile dysfunction (Leriche syndrome). The pain in this condition is exercise induced and relieved by rest.

**(Choice 5)** Hip osteoarthritis causes pain localized deep within the joint (in contrast to the superficial tenderness here) that may be referred to the inguinal area or rarely to the knee. Hip osteoarthritis is uncommon before the age of 50. Classically, internal rotation of the hip worsens this pain.

97. Question

1 points

**Category: Surgery**

A 36-year-old woman complains of severe episodes of headache, tremulousness, palpitations, and anxiety. The patient has noted a change in her voice, and she has difficulty swallowing solids. On physical examination, there is a palpable, nontender swelling in front of her neck that moves with deglutition. No cervical lymphadenopathy is noted. Laboratory studies show serum hypercalcemia. An x-ray film of the cervical region reveals irregular calcification in the mass, while magnetic resonance imaging (MRI) of the abdomen confirms the presence of bilateral adrenal lesions. Which of the following would be the best screening test for the thyroid mass in this patient?



1. ☐ An iodine-123 (<sup>123</sup>I) scan
2. ☐ Measurement of the serum thyroid-stimulating hormone (TSH) level
3. ☐ Measurement of the serum thyroxine (T<sub>4</sub>) level
4. ☐ Measurement of the serum calcitonin level ☐
5. ☐ Measurement of the serum parathormone level

**INCORRECT** ☐

**The correct answer is 4.**

This woman has bilateral pheochromocytoma (bilateral adrenal lesions), a parathyroid adenoma (hypercalcemia and ectopic calcium deposits), and an oversized thyroid (a palpable, nontender swelling in front of her neck). This by definition is an example of multiple endocrine neoplasias (MEN). There are three such multi gland syndromes, called MEN 1 (aka, Wermer syndrome), MEN 2a (aka, Sipple syndrome), and MEN 2b. All are inherited as autosomal dominant traits. MEN 1 is caused by a mutation in a tumor suppressor gene on chromosome 11; in this germline mutation, tumors form in cells in which the normal allele is suppressed. Both MEN 2a and 2b are due to mutations in a gene that codes for a protooncogene called RET, which is only expressed in cells with a neuro crest origin, such as medullary thyroid C-cells and chromaffin cells. (C-cells are sometimes also found in parathyroid tissue.) The RET gene is located on chromosome 10, and a given kindred will have a mutation in a specific codon that will correlate with a variation in clinical expression, such as age first expressed. This probably also accounts for the unique characteristics of MEN 2b, which include gastrointestinal and mucosal neuromas, a Marfan-like phenotype with skeletal abnormalities, as well as medullary carcinoma and pheochromocytoma. Genetic testing can identify 95% of persons with a mutated gene and is of value for genetic counseling and for identification of affected family members before symptoms arise; the latter permits a prophylactic thyroidectomy. Among adults worldwide, the prevalence of all three types of MEN is estimated to be between 0.2 and 2 cases per 105 individuals; about 90% of cases are MEN 1, and MEN 2a makes up almost all of the remainder (MEN 2b is extremely rare). There is a 2:1 male-to-female ratio. The approximate degree to which the various organs are affected is as follows: MEN 1, parathyroid more than 80%, pancreas 75%, pituitary, 60%; MEN 2a, medullary thyroid carcinoma more than 90%, parathyroid 20%–50%, pheochromocytoma 20%–35%; MEN 2b, mucosal and gastrointestinal gangliomas more than 90%; medullary thyroid carcinoma 80%, pheochromocytoma, 60%, and parathyroid, rarely. Accordingly, the woman described in the vignette has MEN 2a. Medullary carcinomas of the thyroid derive from C cells, which synthesize calcitonin. For MEN 2a, serum calcitonin is the best screen. A provocative stimulation test using omeprazole, pentagastrin, or calcium can be used on family members to identify those who are at risk for developing medullary carcinoma. Although medullary carcinomas of the thyroid arising from MEN 2a are usually not highly aggressive, eventually death will ensue unless the thyroid is removed; thus, early identification by genetic screening of children in affected families is important.

**(Choices 2 & 3)** Serum thyroid-stimulating hormone (TSH) and serum thyroxine (T<sub>4</sub>) levels are normal in patients with medullary carcinoma.

**(Choices 1 & 5)** An iodine-123 (<sup>123</sup>I) scan and measurement of the serum parathyroid hormone level are of no additional value in determining a diagnosis in this patient and would only identify half the cases.

98. Question

1 points

**Category: Surgery**

A 33-year-old man who had been morbidly obese underwent successful Roux-en-Y gastric bypass surgery 33 months earlier. However, recently, he has been having disturbing symptoms. These include insomnia, sensory disturbances such as numbness and tingling in his hands and feet, as well as an inflamed tongue, dizziness, and poor coordination and balance. In addition, he developed a strange way of walking, a stomping gait striking first heavily with his heel. He had not returned for 2 or more years after the gastric bypass operation to see a physician, but because of concern about these symptoms, he finally did. When quizzed about his dietary habits, he responded that he thought he ate a balanced diet of the type prescribed for post-gastric bypass surgical patients and that he generally, but not always, did take a daily multivitamin pill, but after the first half year or so he did not take any special supplements; he felt they were too expensive and unnecessary. The symptoms described and the patient's somewhat lackadaisical approach to his postsurgical diet leads the physician to believe that the patient's symptoms were almost certainly due to a nutritional deficiency. The deficiency that would most likely cause the symptoms described is which one of the following?

1. ☐ Iron
2. ☐ Vitamin B<sub>12</sub> (cobalamine) ☒
3. ☐ Folate
4. ☐ Zinc
5. ☐ Copper

**INCORRECT** ☐

**The correct answer is 2.**

Roux-en-Y gastric bypass surgery removes most of the stomach, leaving only a small pouch, which is attached directly to the small intestine at the level of the jejunum, bypassing most of the stomach and the duodenum. This leaves patients vulnerable to nutritional deficiencies, since many vitamins and minerals are normally absorbed from these missing areas. To avoid deficiency states, all persons who have had gastric bypass surgery are told to consume specific vitamin and mineral supplements. Studies have shown that special

supplements, in addition to a standard multivitamin-mineral pill are required to prevent deficiencies of iron and vitamin B<sub>12</sub>. This patient did not take such supplements, and not too surprisingly, he demonstrated classic symptoms of B<sub>12</sub> (cobalamine) deficiency. Even individuals who have not had bariatric surgery are at some risk for cobalamine deficiency because of the way it is absorbed from the gut. Initially, it must be separated from the foods to which it is usually bound; once free, it must then bind to the “intrinsic factor,” a substance normally released from the parietal cells of the stomach; this normally occurs in the duodenum. This B<sub>12</sub> intrinsic factor complex is then absorbed in the ileum. The classic presentation of B<sub>12</sub> deficiency is pernicious anemia caused by a lack of intrinsic factor due to an autoimmune attack on the parietal cells; similarly, in the Roux-en-Y process, the part of the stomach removed by the surgeon includes most of the parietal cells; consequently, these patients will become B<sub>12</sub> deficient unless their diet is supplemented. Initially, it was thought this need be by intramuscular injections. However, more recently, it has been demonstrated that rather massive oral supplementation worked just as well. (The amount in a normal multivitamin pill is usually 2 mcg, but in the oral supplements used for post Roux-en-Y patients the amount used is 1,000 to 2,000 mcg). This is what this patient admits he did not take. In humans, only two reactions require a cobalamine cofactor. The first is a reaction catalyzed by homocysteine methyltransferase. When too little cobalamine is available to permit this reaction to occur, folate accumulates in the otherwise nonfunctional N<sup>5</sup>-methyl form making the N<sup>5</sup>-N<sup>10</sup>-methylene and the N<sup>10</sup>-formyl derivatives unavailable for synthesis of the nucleotides required for RNA and DNA metabolism. Consequently, in the absence of excess folate to form these derivatives, a vitamin B<sub>12</sub> deficiency causes a macrocytic (megaloblastic) anemia. However, if sufficient exogenous folate is available to form the N<sup>5</sup>-N<sup>10</sup>-methylene and the N<sup>10</sup>-formyl derivatives, a vitamin B<sub>12</sub> deficiency does not cause an anemia. Since the multivitamin supplement used in the post Roux-en-Y gastric bypass surgery protocol supplies excess folate, this vitamin B<sub>12</sub> deficiency does not cause an anemia. The second reaction requiring cobalamine as a cofactor is methyl malonyl CoA mutase, a reaction required in a sequence in which fatty acids with an odd number of carbons can be converted into succinyl CoA. When this sequence is inhibited by a lack of vitamin B<sub>12</sub>, odd-numbered fatty acids accumulate and are incorporated into the myelin sheath of nerves. This leads to demyelination and symptoms of peripheral neuropathy, such as those described for this patient. It may also cause sensory ataxia due to loss of proprioception initiated by dysfunction of the dorsal and lateral columns of the spinal cord; this leads to the stomping gait described. If not treated in time, it will also bring about malfunctions in various parts of the brain.

**(Choices 1,3,4 & 5)** All these choices are incorrect. It may be that he also has an iron deficiency because a special iron supplement is also recommended for post-surgery patients. Since adult males require very little iron, this is most important for menstruating females; moreover, if he was iron deficient this would cause a microcytic anemia contributing to fatigue but not to the neurological problems this patient has. Most post Roux-en-Y patients have higher serum folate levels after surgery than before surgery without use of a special supplement. Thus, it is unlikely that this patient suffered a folate deficiency. Similarly, there is no reason to suspect either a zinc or copper deficiency.

## 99. Question

1 points

## Category: Surgery

A 6-year-old boy has insidious development of limping with decreased motion in one hip. He complains occasionally of knee pain on that side. He walks into the office with an antalgic gait. Examination of the knee is normal, but passive motion of the hip is guarded. The child is afebrile, and the parents indicate that his gait and level of activity were completely normal all his life until this recent problem. He has not had a recent febrile illness. Which of the following is the most likely diagnosis?

1. ☐ Avascular necrosis of the capital femoral epiphysis ☐
2. ☐ Developmental dysplasia of the hip
3. ☐ Hematogenous osteomyelitis of the femoral head
4. ☐ Septic hip
5. ☐ Slipped capital femoral epiphysis

INCORRECT ☐**The correct answer is 1.**

Hip pathology often presents with knee pain, and in this case the problem is clearly in the hip. Age is the next clue. Avascular necrosis (also known as idiopathic aseptic necrosis or Legg-Calvé Perthes disease) occurs typically in this age group, with preference for boys rather than girls.

**(Choice 2)** is present at birth (it used to be called congenital dislocation of the hip, a name that was changed for medico legal reasons) and, if untreated, would have caused problems earlier.

**(Choice 3)** Osteomyelitis is usually seen in peripheral bones, following a febrile illness in toddlers. Fever is ~' also usually seen at the time that the osteomyelitis has developed.

**(Choice 4)** The same is true of a septic hip, which should be suspected when a toddler with a recent febrile illness suddenly refuses to move a hip and has so much pain that he does not allow anyone to examine it.

**(Choice 5)** Slipped capital femoral epiphysis should be suspected when a chubby, 12- to 14-year-old boy shows up with hip pain and inability to internally rotate the hip. Age, again, is the first clue.

## 100. Question

1 points

## Category: Surgery

A 65-year-old male jumps off of a bus to catch a train. He immediately feels very severe pain in the front of the knee and hears a snap. He falls to the ground and is unable to rise. The emergency physician determines that the patient is a diabetic whose diabetes is controlled by oral hypoglycemics. He has no allergies and is not on any other medications. He exercises occasionally, and he is overweight. His vital signs are as follows: pulse, 86/min; respirations, 18/min; blood pressure, 150/97 mm Hg. His temperature is normal. The patient complains of pain in the right knee. Clinical examination reveals swelling and tenderness in the anterior aspect of the knee, and a sulcus is palpable proximal to the superior pole of the patella; no fragments can be moved. The patient is unable to extend the knee. Hemarthrosis is absent. Which of the following is the most likely diagnosis?

1. ☐ Tear of the quadriceps expansion ☐
2. ☐ Tear of the anterior cruciate ligament
3. ☐ Transverse fracture of the patella
4. ☐ Tear of the posterior cruciate ligament
5. ☐ Avulsion of the quadriceps tendon from the tibial tuberosity

**INCORRECT** ☐

**The correct answer is 1.**

This patient has a tear of the quadriceps expansion, which may result from direct or indirect injury. It can occur within the muscle, at the tendon-muscular junction, within the tendon itself, or at the tendo-osseus junction (most common in the elderly). Tears of the quadriceps expansion are most common in older individuals who are overweight and in poor physical condition. The usual history is of missing a step and tripping while descending a staircase or suddenly jumping down from a height. Patients complain of severe pain, often feel or hear a snap, and fall to the ground. Physical examination reveals swelling and tenderness at the site of the tear, and a sulcus or gap is felt at the site of separation, especially if the tear is complete. If the tear is partial, the patient has difficulty extending the knee; if the tear is complete, the patient cannot extend the knee. Tears of the quadriceps expansion can also occur in athletes and young individuals. In athletes, the tears are most often at the insertion of the tendon into the tibial tubercle.

**(Choice 4)** Tears of the posterior cruciate ligament usually occur because of hyperextension and are associated with a positive sag sign. They are not associated with inability to straight-leg raise, swelling of the anterior aspect of the knee, or a gap between the fibers of the quadriceps expansion or tendon.

**(Choice 2)** Although it is true that a snapping sound is heard in tears of the anterior cruciate ligament, there is hemarthrosis and a positive Lachman's test result. The inability to straight-leg raise, a gap felt at the site of the tear, and swelling confined to the anterior aspect of the knee are not features of this condition.

**(Choice 3)** is the main differential diagnosis. Fractures of the patella can result from direct or indirect trauma. In older individuals who are obese and in poor physical shape, an indirect injury resulting from tripping down stairs, jumping from a height, or even forcefully squatting can result in fracture of the patella. The patient complains of severe pain and falls to the ground. Difficulty in straight-leg raise, swelling over the knee, and hemarthrosis are seen. A gap can be felt in the patella, and the fragments can be moved, which distinguishes it from a pure tear of the quadriceps expansion.

**(Choice 5)** usually occurs in a younger individual. In teenagers, the epiphysis is weaker than the tendon, and it can be sheared off from its moorings. The gap is felt below the inferior pole of the patella. In the case presented, the gap is felt above the superior pole of the patella.

## 101. Question

1 points

### Category: Surgery

Six hours after undergoing laparoscopic bilateral inguinal hernia repairs, a 62-year-old man complains of suprapubic discomfort and fullness. He feels the need to void but has not been able to do so since the operation. There is a palpable suprapubic mass that is dull to percussion. Palpation of that mass exacerbates the symptoms. Which of the following is the most appropriate next step in management?

1. ☐ Abdominal x-ray films to ascertain the nature of the mass
2. ☐ Increased rate of IV fluid administration
3. ☐ Loop diuretics
4. ☒ In and out bladder catheterization ☐
5. ☐ Placement of indwelling Foley catheter

**INCORRECT** ☐

**The correct answer is 4.**

The problem is urinary retention, which is extremely common in the immediate postoperative period after lower abdominal, inguinal, or perineal surgery. The bladder must be emptied by catheterization and allowed to regain normal function with the passage of time.

**(Choice 1)** X-ray films are not needed. The nature of the mass is clear from the physical examination and the circumstances of the case.

**(Choice 2)** Increasing the rate of fluid administration would simply compound the problem. The patient is not voiding because of a functional problem at the bladder neck, not because he is not making enough urine.

**(Choice 3)** Loop diuretics are wrong for the same reasons that more fluids would be wrong.



**(Choice 5)** An indwelling Foley catheter would indeed solve the problem, but it would be too aggressive a step. No one advocates leaving a catheter in place at the first catheterization. If it needs to be repeated once (and some say if it needs to be repeated twice), then an indwelling catheter is needed.

102. Question

1 points

**Category: Surgery**

A 62-year-old woman has an eczematoid lesion in the areola of her right breast that has been present for 3 months. She has self-medicated with skin lotions and over-the-counter steroid ointments, but the area has not improved. On physical examination, the nipple is inverted, the skin of the areola is reddish and desquamated, and the entire area feels firm, with no discrete mass demarcated from the rest of the breast. Which of the following is the most appropriate next step in management?

1. ☐ Estrogen cream and systemic estrogen replacement
2. ☐ Mammogram and galactogram
3. ☐ Mammogram and punch biopsies ☐
4. ☐ Serum levels of glucagon and CT of the pancreas
5. ☐ Skin scrapings, culture, and appropriate topical antibiotic

**INCORRECT** ☐

**The correct answer is 3.**

This is the classic description of Paget disease, an infiltrating cancer of the breast directly underneath the areola that is permeating the skin lymphatics and the skin itself. Although it is true that the areola is not immune to other benign skin conditions, missing the cancer would be lethal. Thus, any other answer that does not seek to rule out cancer first is wrong.

**(Choice 1)** Treatment with estrogens assumes a benign, age-related atrophy, which is common in the vagina but not in the areola.

**(Choice 2)** A mammogram and galactogram are indicated to find intraductal papilloma, the presentation of which is bloody nipple discharge in a younger woman.

**(Choice 4)** Looking for a glucagonoma is a distracter that might appeal to those who are convinced that the USMLE emphasizes bizarre, rare diseases. Indeed glucagonoma shows up as an intractable skin condition, but it is migratory, necrolytic, and exfoliative. It occurs in anemic diabetic patients with glossitis, and shows no preference for the areola.

**(Choice 5)** Culture and topical antibiotics is the intuitive answer if you assume that this is a nasty skin infection, but never make that your first diagnosis in this setting

103. Question

1 points

**Category: Surgery**

A 53-year-old man is brought to the emergency department by his wife because of headache and visual changes. Approximately 3 hours ago, he had the acute onset of an extremely severe posterior headache that was non-radiating but was associated with nausea and vomiting. This headache subsided, but over the past hour he has developed mild neck stiffness and pain on flexion of his neck. The patient is not cooperative, so no additional history is known; however, his wife states that he was feeling well until recently and has no allergies. The patient appears moderately uncomfortable and is complaining of the worst headache he has ever experienced. Which of the following is the most likely cause for his symptoms?

1. ☐ Arteriovenous malformation
2. ☐ Cerebellar bleed
3. ☐ Putamenal bleed
4. ☐ Ruptured berry aneurysm ☐
5. ☐ Thalamic bleed

**INCORRECT** ☐

**The correct answer is 4.**

This is a classic presentation of a ruptured berry aneurysm. There must be a high suspicion for this diagnosis, since failure to make it will likely result in the death of the patient. Although the diagnosis of headache is quite common, the classic pattern is that of a sentinel bleed followed by meningismus and agitation that herald a re-bleed in more than 70% of subarachnoid hemorrhage (SAH) patients within 48 hours. Once the SAH is identified (usually with a CT scan), neurosurgical intervention to stop the bleeding can be begun, and the patient thereafter has a normal life expectancy. The most common nontraumatic cause for SAH is a berry aneurysm in the anterior portion of the circle of Willis.

**(Choice 1)** is a rare cause of a SAH and intracranial bleeds in general.

**(Choice 2)** The cerebellum is an uncommon site for bleeds. When they do occur, they are generally due to severe hypertension. Such bleeds are urgent because they can cause brain stem compression or obstructive hydrocephalus if not promptly evacuated.

**(Choices 3 & 5)** The putamen and thalamus are the most common sites for hypertensive bleeds. Such bleeds do not produce meningismus, only mental status changes and focal neurologic deficits.

**Category: Surgery**

A 62-year-old man with alcoholic cirrhosis of the liver and ascites presents with generalized abdominal pain that started 12 hours ago. He now has moderate tenderness over the entire abdomen, with minimal guarding and equivocal rebound. Bowel sounds are diminished but present. He has a temperature of 38.4 C (101.2 F) and a leukocyte count of 11,000/mm<sup>3</sup>. Although he used to be a heavy drinker; he has not touched a drop of alcohol for the past 7 years. Except for the presence of ascites, upright and flat x-ray films of the abdomen are unremarkable. Which of the following is the most appropriate next step in diagnosis?

1. ☐ CT scan of the abdomen
2. ☐ Serum amylase determinations
3. ☐ Sonogram of the right upper quadrant
4. ☒ Culture of the ascitic fluid ☐
5. ☐ Laparoscopy

**INCORRECT** ☐

**The correct answer is 4.**

Cirrhotic patients with ascites may develop spontaneous primary bacterial peritonitis, which gives a “mild picture of acute abdomen,” and is identified by growing a single organism out of the ascitic fluid.

**(Choice 1)** CT scan is an excellent way to rule out common intra-abdominal conditions that may be suggested by equivocal clinical presentations (e.g., appendicitis, pancreatitis, and diverticulitis). In this case, it would simply show the ascites and nothing else. Thus, it would rule out other things but would not establish the diagnosis.

**(Choice 2)** Serum amylase ought to be the first thought in an alcoholic who develops an acute abdomen, but not if he has not drunk anything for 7 years. This is not the clinical picture of pancreatitis, either.

**(Choice 3)** The biliary tract, which a sonogram would check, can be the source of abdominal pain in a cirrhotic, but it would have the typical clinical presentation of right upper quadrant pain.

**(Choice 5)** Laparoscopy is being used in lieu of exploratory laparotomy when “taking a peek in the abdomen” would establish a diagnosis. It would be a rather invasive way to show that this man has nothing other than ascitic fluid in his abdomen. Furthermore, there would be a risk of prolonged postoperative leak of ascitic fluid through the incision sites.

## Category: Surgery

A 42-year-old man is found unconscious at the scene of a motor vehicle collision. He is rushed to the emergency department, where his blood pressure is found to be 70/40 mm Hg and his respirations are 28/min. On physical examination, his trachea is deviated to the left and his breath sounds are decreased on the right side. His neck veins are distended bilaterally. You also note significant swelling over the right femur. Which of the following is the most appropriate next step in the management of this patient?

1. ☐ Intubation and mechanical ventilation
2. ☐ 100% oxygen via face mask
3. ☐ Immediate thoracotomy
4. ☐ Chest tube placement ☐
5. ☐ Intravenous fluid resuscitation

**INCORRECT** ☐

**The correct answer is 4.**

This patient has findings consistent with tension pneumothorax. Tension pneumothorax occurs when injury establishes a one-way valve into the pleural space. The negative pressure generated with inspiration draws air into the pleural space where it is trapped. As air accumulates in the affected hemithorax, the lungs and mediastinum are pressed into the opposite hemithorax, causing respiratory distress, hypotension and distended neck veins. Lung examination will reveal diminished breath sounds and hyperresonance to percussion on the affected side. Tension pneumothorax is an emergency requiring immediate needle thoracostomy to decompress the thoracic cavity. After relieving the acute pressure buildup and restoring proper ventilation and perfusion, placement of a chest tube under water seal will allow for continued relief of the pneumothorax while healing ensues.

**(Choice 1)** The patient in this vignette is breathing spontaneously, indicating a patent airway. Intubation and mechanical ventilation will not remedy this patient's tension pneumothorax.

**(Choice 2)** 100% oxygen via a face mask may have some benefit for this patient, but will not aid in any way the resolution of his tension pneumothorax.

**(Choice 3)** Tension pneumothorax can be adequately treated with needle and/or tube thoracostomy. Thoracotomy is not necessary.

**(Choice 5)** Fluid resuscitation is indicated for patients with hypotension secondary to intravascular depletion. This patient has hypotension secondary to a tension pneumothorax. If his hypotension were to persist following chest tube placement and resolution of the pneumothorax, then other causes of hypotension like cardiac tamponade or hemorrhage (perhaps secondary to femur fracture) should be considered.

**Category: Surgery**

An 18-year-old female is seen in the ED with a 1-day history of abdominal pain. The patient states that the pain began periumbilically as a dull ache, but it has since migrated to the right lower quadrant. It is now sharp and constant in nature. This morning, the patient began vomiting and had one episode of diarrhea. She is sexually active and her last menstrual period ended 7 days ago. On exam, she is ill appearing and tachycardic. There is involuntary guarding in both quadrants of the lower abdomen. A pelvic exam reveals tenderness noted upon movement of the cervix and during rectal exam. A CBC demonstrates a leukocytosis of 13,000, and  $\beta$ -hCG is negative. What is the most appropriate next step in the management of this patient?

1. ☐ Surgical exploration
2. ☐ Abdominal ultrasound
3. ☐ CT scan of the abdomen ☒
4. ☐ IV hydration and observation
5. ☐ Oral antibiotics and follow-up in 2 days

**INCORRECT** ☐

**The correct answer is 3.**

The CT scan is becoming an important tool in diagnosing acute appendicitis, especially in young females and in patients with atypical symptoms. This patient is a good candidate for CT scan because the management of her case would likely change depending on the radiographic findings. An appendix with a diameter greater than 6 mm, with thickened walls and periappendiceal fat stranding, is diagnostic for appendicitis.

**(Choice 1)** This patient has a history and exam that are consistent with acute appendicitis. However, women of reproductive age pose a diagnostic dilemma when it comes to lower abdominal pain. Ectopic pregnancy, ovarian torsion, pelvic inflammatory disease, tubo-ovarian abscess, and ruptured ovarian cysts should all be included in the differential diagnosis. A CT scan of the abdomen would be the next step in this scenario rather than surgical exploration.

**(Choice 2)** Abdominal ultrasound is especially helpful to diagnose lower abdominal pain in women of reproductive age, looking for ovarian pathology. Ultrasound is user dependent and not as reliable as a CT scan, however.

**(Choice 3)** Although IV hydration is required; the appendicitis will not get better with fluids alone. Instead, this condition requires an operation before perforation of the appendix occurs. Observation is not an appropriate choice in this scenario.

**(Choice 5)** Acute appendicitis is a surgical emergency, for which giving oral antibiotics with a 2-day follow-up is entirely inappropriate.

## 107. Question

1 points

## Category: Surgery

A 53-year-old male is brought to the emergency department after being involved in a motor vehicle accident (MVA) as an unrestrained driver. He was found unresponsive at the scene and was intubated by paramedics. He has received 1 L of normal saline over the last 20 minutes. His blood pressure in the emergency department is 70/30 mm Hg, and his heart rate is 100/min. On physical examination, he responds to strong vocal and tactile stimuli by opening his eyes. His pupils are equal and reactive to light. On exam, there are multiple bruises over the anterior chest and upper abdomen. The trachea is midline. A Swan-Ganz catheter reveals a pulmonary capillary wedge pressure of 12 mm Hg. Rapid infusion of 1 L of normal saline increases the pulmonary capillary wedge pressure to 17 mmHg, with a blood pressure of 75/30 mmHg and heart rate of 103/min. Which of the following is the best treatment for this patient?

1. ☐ Anticoagulation
2. ☐ High-rate IV fluids
3. ☐ Inotropic agents ☒
4. ☐ Pericardiocentesis
5. ☐ Chest tube

INCORRECT ☐**The correct answer is 3.**

This patient suffered severe blunt thoracic trauma from steering wheel impact during a MVA. He presents with hypotension, borderline tachycardia, and a pulmonary capillary wedge pressure (PCWP) at the upper limit of normal after 1 L of IV saline. A second liter IV saline bolus significantly elevates the PCWP but does not correct the patient's hypotension. The PCWP is an indirect measure of left atrial pressure. PCWP elevation with persistent hypotension following an IV fluid bolus indicates left ventricular failure. Thus, this patient is in cardiogenic shock. Cardiogenic shock is defined as the heart's failure to generate sufficient output to meet the metabolic demands of the tissue. In patients suffering blunt thoracic trauma, causes of cardiogenic shock include myocardial infarction, arrhythmia, myocardial contusion or compression (as in pericardial tamponade). All forms of cardiogenic shock should be initially treated with intravascular volume expansion up to a PCWP of 15-20 mm Hg. Inotropic medications, like dopamine or dobutamine, can then be used to maintain cardiac output without increasing heart rate.

Cardiogenic (LV

dysfunction): contusion,

MI, traumatic valve or septa l  
rupture;

↓

V

↑

↑↑



arrhythmia

Cardiogenic (RV dysfunction): contusion, MI

↓

V

↓, N

U or ↑

Extracardiac obstructive:  
tension  
pneumothorax massive  
hemothorax

↓

↑

↓, N

U or ↑

Extracardiac obstructive:  
pericardial  
tamponade

↓

↑

↑

↑ or ↑↑

Neurogenic

↓

↑, N

↓, N

↑

Septic (Hyperdynamic

↓

↑

↓, N

↑

MAP = mean arterial pressure; V = Variable  
HR = heart rate; N = Normal; U = Unchanged

PCWP = pulmonary capillary  
wedge pressure

**(Choice 1)** Anticoagulation is indicated in shock due to early DIC or massive pulmonary embolism.

**(Choice 2)** This patient's PCWP is already high. Further IV volume expansion would risk pulmonary edema.

**(Choice 4)** Pericardiocentesis is part of the treatment for cardiac tamponade. Cardiac tamponade most commonly occurs following penetrating thoracic trauma, but may occur in blunt trauma as well. Beck's triad of hypotension, jugular venous distention and muffled heart sounds is seen.

**(Choice 5)** A chest tube would be an appropriate treatment for a tension pneumothorax. Tension pneumothorax classically causes tracheal deviation away from the involved hemithorax, low or a normal value of initial PCWP and absent breath sounds over the involved hemithorax. Tension pneumothorax obstructs venous return to the right heart.

## 108. Question

1 points

### Category: Surgery

A 40-year-old retired professional football player complains of the sudden onset of palpitations and shortness of breath 5 days after having knee replacement surgery. His pulse is 100/min and regular. Oxygen saturation is 90% room air. An ECG reveals sinus tachycardia. A chest x-ray film is unremarkable. Which of the following is the most appropriate next step in management?

1. ☐ Order an arterial blood gas
2. ☐ Schedule a duplex Doppler examination of the lower extremities
3. ☐ Schedule a ventilation-perfusion scan
4. ☐ Administer supplemental oxygen
5. ☐ Administer IV heparin ☒

**INCORRECT** ☐

**The correct answer is 5.**

This patient most likely has a pulmonary embolism. Pulmonary embolism occurs following general surgery in 1 to 2% of patients older than 40. The incidence is higher (5 to 10%) following orthopedic surgery of the hip or knee. Venous stasis due to immobilization is probably a major reason for venous thrombosis associated with surgery. However, other factors, such as increased blood fibrinolytic activity and vessel damage, may be involved as well. This patient is very high-risk for pulmonary embolism due to his recent surgery. Further, he is showing evidence of hypoxemia, because his pulse oximetry reading is 90% on room air, which corresponds to a P02 of about 60. An ECG showing sinus tachycardia and a negative chest X-ray also gives clue to the diagnosis.

**(Choice 1)** This patient should immediately receive anticoagulation with IV heparin. Ordering an arterial blood gas is not required for the reasons stated above. Because this patient is already hypoxemic (as evidenced by his pulse oximetry) and high-risk, we do not need to confirm it with a blood gas measurement at this time.

**(Choices 2 & 3)** A Duplex Doppler examination and ventilation-perfusion scan are important in confirming the diagnosis of pulmonary embolism, but this patient should be anticoagulated first, to avoid further embolic events.

**(Choice 4)** Supplemental oxygen should be given after the administration of heparin has occurred. These two are often performed simultaneously in the clinical setting. The fundamental concept to grasp is what the most important step is for this patient right now.

109. Question

1 points

**Category: Surgery**

A multiple trauma patient receives 14 units of packed red cells and several liters of Ringer's lactate solution during a laparotomy for multiple intra-abdominal injuries. The surgeons note that blood is oozing from all dissected raw surfaces, as well as from his IV line sites. His core temperature is normal. Which of the following is the most appropriate next step in management?

1. ☐ Proceed with surgery and give blood transfusions as needed

2. ☐ Obtain a stat coagulation profile to guide specific therapy
3. ☐ Empiric administration of fresh frozen plasma and platelet packs ☒
4. ☐ Abort the operation and close the abdomen with towel clips
5. ☐ Leave the abdomen open and covered with mesh until coagulation parameters can be corrected

**INCORRECT** ☐

**The correct answer is 3.**

In the setting of massive blood loss and multiple transfusions (more than 12 units of packed red cells), the development of coagulopathy is almost predictable. Packed red cells contain virtually no viable platelets and only a very small concentration of clotting factors.

Prophylactic administration of clotting factors has not proven to be advantageous, but once the coagulopathy occurs, a shotgun approach to provide fresh frozen plasma and platelet packs is indicated.

**(Choice 1)** Ignoring the coagulopathy and continuing to operate and transfuse would be doomed to failure. Surgeons can ligate or cauterize big vessels but cannot do the same for capillaries. Proper clotting is indispensable in all surgical operations.

**(Choice 2)** Although it would be more elegant to determine exactly what is missing, under these circumstances there is no time to do the detailed studies.

**(Choice 4)** If hypothermia and acidosis had also developed, a more drastic approach would have been necessary: stop the operation and close the abdomen temporarily.

**(Choice 5)** Closing with a mesh is indicated when an abdominal compartment syndrome occurs-it has nothing to do with coagulopathy.

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## 110. Question

1 points

### Category: Surgery

A 73-year-old man comes to the physician because of right anterior thigh pain that is worse with walking. He has a history of stable angina, hypertension, hypercholesterolemia, and COPD with periodic exacerbations. He takes ipratropium, aspirin, metoprolol and pravastatin. He smokes 2 packs a day and drinks alcohol occasionally. Physical examination shows a small pulsatile mass in the right groin area. Which of the following is the most likely diagnosis?

1. ☐ Femoral vein aneurysm
2. ☐ Femoral artery aneurysm ☒
3. ☐ Indirect inguinal hernia

- 4. ☐ Direct inguinal hernia
- 5. ☐ Femoral hernia

**INCORRECT** ☐

**The correct answer is 2.**

The clinical scenario described is consistent with a femoral artery aneurysm. A pulsatile groin mass below the inguinal ligament is characteristic; anterior thigh pain is due to the compression of the femoral nerve that runs lateral to the artery. Femoral artery aneurysm is the second most common peripheral artery aneurysm after popliteal aneurysm. It may be associated with an abdominal aortic aneurysm.

**(Choice 1)** Femoral vein dilatation usually results from AV fistula (typically traumatic); venous hypertension usually results.

**(Choices 3 & 4)** Inguinal hernias are located above the inguinal ligament; an indirect hernia may descend into the scrotum.

**(Choice 5)** Femoral hernias are located below the inguinal ligament, but are not pulsatile.

## 111. Question

**1 points**

### Category: Surgery

A 28-year-old female is ejected from her car after it is struck from the side by a car traveling approximately 50 mph. At the accident scene, her initial GCS is 10. The patient was intubated by the paramedic for respiratory distress and is brought to the emergency department in critical condition. The paramedic reports that the patient's blood pressure has been slowly falling during transport. The last pressure was 64/40 with a heart rate of 133 and an oxygen saturation rate of 62%. You notice obvious deformities of multiple ribs of the left chest. What is the first step in managing this seriously injured patient?

- 1. ☐ Administer IV fluid bolus for hypotension
- 2. ☐ Stabilize her chest injury
- 3. ☐ Obtain a chest x-ray
- 4. ☐ Reevaluate the airway ☐
- 5. ☐ Place a central line

**INCORRECT** ☐

**The correct answer is 4.**

This critically ill patient is in shock and has obvious serious injuries. In any trauma situation, one always begins with the basics: airway, breathing, and circulation. Because this patient is critically injured, it is vital to secure the airway. Despite the fact that she is already intubated, it is important to confirm the placement of the endotracheal tube, which is evident by the poor oxygen saturation level. Often it is easier to reintubate the patient to guarantee that the endotracheal tube is in the correct position. This measure should be taken before moving to the next step.

**(Choice 1)** While this patient's hypotension is very concerning and needs to be promptly addressed, you still start by securing the airway before addressing the other issues. Often, these tasks are being accomplished simultaneously; if not, always follow the ABCs.

**(Choice 2)** If tension pneumothorax is suspected, a needle thoracostomy may be indicated. The first step, however, is always to make sure the airway is secure.

**(Choice 3)** A chest x-ray is important to evaluate for chest injuries but securing the airway takes precedence.

**(Choice 5)** Placing a central line falls under circulation, which is secondary to establishing an airway.

112. Question

1 points

**Category: Surgery**

You evaluate a 42-year-old male driver in the emergency room who has previously been involved in a high-speed, head-on, motor vehicle accident. His GCS is 15. After the initial ABCs of trauma care are completed, you note that the only significant injury appears to involve the patient's abdomen. The abdominal exam shows diffuse tenderness, peritoneal signs, and seat belt imprint on the lower chest and abdomen. The patient is taken to the OR; during the ensuing surgical exploration, you repair a small bowel mesentery laceration and find a large, right retroperitoneal hematoma surrounding the right kidney. What is the most appropriate management of this hematoma at this time?

1. ☐ Close the abdomen and obtain a CT
2. ☐ Obtain an intraoperative angiogram
3. ☐ Explore the hematoma if it is expanding ☐
4. ☐ Remove the involved kidney
5. ☐ Open the hematoma

**INCORRECT** ☐

**The correct answer is 3.**

Exploration of the hematoma-but only if it is expanding or is very large-is the correct choice. Although most lateral retroperitoneal hematomas are small and nonexpanding and, therefore, do not require exploration, large, expanding, or pulsatile hematomas around the kidney require this step to control bleeding.

**(Choice 1)** To close the abdomen and obtain a CT scan is a reasonable option if the hematoma is small and not expanding.

**(Choice 2)** It would be technically difficult, if not impossible, to obtain an intraoperative angiogram that accesses the renal blood flow and offers the detail needed to evaluate a renal vascular injury.

**(Choice 4)** Removing the involved kidney may be needed for major vascular injuries. In the majority of cases, blunt renal trauma is contained by Gerota's fascia. When this condition is conservatively treated with observation, patients have a reasonable rate of healing with normal renal function.

**(Choice 5)** Opening the hematoma regardless of size or position is incorrect. Lateral retroperitoneal injuries (Zone II) and pelvic hematomas (Zone III) do not routinely require exploration, unlike upper central retroperitoneal hematomas (Zone I), which should be explored because of the high rate of associated vascular and pancreatic injuries.

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113. Question

1 points

**Category: Surgery**

A patient sustained third-degree burns on both his arms when his shirt caught on fire while he was lighting the backyard barbecue. The burned areas are dry, white, leathery, anesthetic, and circumferential all around the arms and forearms. Which of the following parameters should be very closely monitored?

- 1. ☐ Blood gases
- 2. ☐ Body weight
- 3. ☐ Carboxyhemoglobin levels
- 4. ☐ Myoglobinemia and myoglobinuria
- 5. ☐ Peripheral pulses and capillary filling ☐

**INCORRECT** ☐

**The correct answer is 5.**

Circumferential burns of the extremities pose a distinct hazard to peripheral circulation because the edema fluid resulting from the burn cannot expand under the unyielding



envelope of the burn eschar. Compulsive monitoring of pulses and capillary filling is required; escharotomy also may be required.

**(Choices 1 & 3)** Although flame burns can cause smoke inhalation and the so-called respiratory burn, they do so only when the victim is trapped in an enclosed space: a burning car, a plane, a building. In those situations you would monitor blood gases and carboxyhemoglobin levels. This fellow was burned in the backyard (a well ventilated place), so these are not a valid concern.

**(Choice 2)** does not change much with the massive internal fluid shifts of a major burn. We guide our fluid therapy by urinary output and central venous pressure, not by monitoring body weight.

**(Choice 4)** As for myoglobinemia and myoglobinuria, they are of paramount concern in high voltage electrical burns or crushing injuries, not in flame burns.

#### 114. Question

1 points

##### Category: Surgery

A 55-year-old male Asian immigrant presents to the physician because of recent-onset neck swelling. He also notes having several episodes of epistaxis lately. He has not sustained any trauma to the neck or nose. His past medical history is significant for syphilis and recurrent bacterial sinusitis. He drinks 2 beers daily and has a 30-pack year smoking history. He takes daily multivitamins with antioxidants. On physical examination, you note a mass in the posterior nasal cavity. Biopsy shows undifferentiated carcinoma. Which of the following is a risk factor for this cancer?

1. ☐ Alcohol use
2. ☐ Spirochete infection
3. ☐ Bacterial infection
4. ☐ Viral infection ☒
5. ☐ Vitamin supplements

**INCORRECT** ☒

**The correct answer is 4.**

This patient has nasopharyngeal carcinoma (NPC), an undifferentiated carcinoma of squamous cell origin seen with higher frequency in people of Mediterranean or Far Eastern descent. These tumors are usually asymptomatic until disease is advanced; most NPC is metastatic at the time of diagnosis. Patients with NPC often present with recurrent otitis media (resulting from eustachian tube obstruction by tumor), recurrent epistaxis, and/or nasal obstruction. Undifferentiated NPC is strongly associated with positive serologies for

Epstein-Barr virus (EBV). The association is so strong that EBV titer levels may be used to track the progress of therapy for this malignancy. This cancer is also associated with smoking and with chronic nitrosamine consumption (as in diets rich in salted fish).

**(Choice 1)** Chronic alcohol use is a risk factor for alcoholism, alcoholic cirrhosis, aspiration pneumonia, Wernicke-Korsakoff syndrome, depression and liver neoplasms.

**(Choice 2)** Untreated syphilis will proceed through primary, secondary and tertiary phases. Primary syphilis is characterized by the appearance of a painless chancre; secondary syphilis is characterized by disseminated skin lesions, condylomata lata, and fever; and tertiary syphilis may be marked by ascending aortitis, tabes dorsalis, psychosis and tumors (gummas) of the skin, bone and liver.

**(Choice 3)** *Helicobacter pylori* gastritis is one type of bacterial infection that has been shown to be associated with malignancy, causing an increased risk of gut-associated lymphoid tissue (GALT) lymphoma.

**(Choice 5)** Over-the-counter dietary supplements are not known to increase patients' malignancy risk. Supplements can cause disease and/or toxicity when they interfere with other medications or are used in excess.

## 115. Question

1 points

### Category: Surgery

A 67-year-old male comes to the clinic for medical clearance prior to an elective abdominal aortic aneurysm repair. He denies any cough, shortness of breath or chest pain. He has coronary artery disease, diabetes and hypertension. He does not use tobacco, alcohol or drugs. His blood pressure is 120/76 mm Hg, pulse is 60/min, and respirations are 14/min. Examination shows no abnormalities, except prominent epigastric pulsations. Which of the following interventions would be most helpful in preventing postoperative pneumonia in this patient?

1. ☐ Albuterol inhalers
2. ☐ Prophylactic antibiotics
3. ☐ Incentive spirometry ☒
4. ☐ Continuous positive airway pressure
5. ☐ Intercostal nerve blocks for pain control

**INCORRECT** ☐

**The correct answer is 3.**

This patient has numerous risk factors for postoperative pneumonia. His age, poor health, and scheduled long invasive surgery put him at increased risk. Postoperative measures used to decrease the risk of pneumonia are aimed at encouraging lung expansion. These include

incentive spirometry, deep breathing exercises, continuous positive airway pressure, and intermittent positive pressure breathing. Of these, incentive spirometry has been shown to be the most effective, and is thus the first line preventive measure.

**(Choice 1)** Albuterol inhalers are used preoperatively in patients with COPD or asthma, exhibiting dyspnea or wheezing. This treatment is unnecessary for a patient without preexisting pulmonary disease.

**(Choice 2)** Prophylactic antibiotics prior to surgery are only used in patients with evidence of preexisting respiratory infection. The use of antibiotics in patients without respiratory infection has not been shown to improve outcomes, and may increase the risk of developing antibiotic-resistant pneumonia.

**(Choice 4)** Continuous positive airway pressure (CPAP), like incentive spirometry, promotes lung expansion postoperatively. However, it is more costly and has a higher rate of complications than incentive spirometry. For these reasons, CPAP is used only in patients who develop pulmonary complications in spite of incentive spirometry.

**(Choice 5)** By controlling pain and encouraging early ambulation, intercostal nerve blocks have shown some efficacy in preventing postoperative pulmonary complications. The findings have been most pronounced in patients under age 50, and with subcostal incisions.

## 116. Question

1 points

### Category: Surgery

A 29-year-old woman is brought to the emergency department after burning her right upper extremity in a cooking accident. Examination shows a circumferential burn of the right upper extremity. She is given fluids, an analgesic and a wound dressing. On day three she develops severe deep tissue pain in the right limb with edema of the hand. Examination shows a circumferential eschar over the right arm. Her right radial and ulnar pulses are faint compared to the left and she has paresthesias in her right hand. Which of the following is the most appropriate next step in management?

1. ☐ Increase the dose of her analgesics and discharge her
2. ☐ Do an angiography to assess arterial blood flow
3. ☐ Do an escharotomy ☐
4. ☐ Look for a missed fracture of the right upper limb
5. ☐ Elevation of the limb

INCORRECT ☐

**The correct answer is 3.**

Eschar is firm necrotic tissue classically formed on exposed tissue following burn wounds. When eschar occurs circumferentially on an extremity, it can restrict outward expansion of the compartment as edema occurs following a burn. As a result, interstitial pressure rises to the point that vascular flow to the limb is compromised. Clinical signs of compartment syndrome include deep pain out of proportion to the injury, pulselessness, paresthesias, cyanosis and pallor of the affected extremity. Compartment syndrome resulting from circumferential compression by eschar can be relieved by performing an escharotomy. A muscle compartment pressure that exceeds 30 mm Hg is also an indication for escharotomy.

**(Choice 1)** Prompt escharotomy is necessary in cases of vascular compromise due to circumferential eschar. Analgesics will provide symptomatic relief but will only mask the underlying problem. Analgesics are not typically required during escharotomies as the incised tissue is classically insensate.

**(Choice 2)** The most reliable means of monitoring adequacy of circulation in a circumferentially burned limb is serial examination using a Doppler ultrasonogram flow meter. Angiography is not indicated here as diagnosis of compartment syndrome is obvious and delaying escharotomy for a radiologic study is not indicated.

**(Choice 4)** A missed fracture may cause delayed pain and swelling in an extremity, but it should not cause vascular compromise.

**(Choice 5)** Elevation of the limb is not a treatment for compartment syndrome. It can be used for dependent edema following an injury such as a sprain.

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117. Question

1 points

**Category: Surgery**

A 34-year-old man complains of severe abdominal pain. He describes the pain as “sharp” and “unbearable.” It is located in the lower left abdomen and radiates to the perineum. He has vomited twice since the pain began. He denies dysuria. On exam, he is afebrile. He cannot lie still on the examination table due to his discomfort. Mucus membranes appear slightly dry. Lungs are clear to auscultation. Heart sounds are normal and there are no murmurs or gallops. His abdomen is soft and non-tender to palpation. Inspection and palpation of his genitalia is unrevealing. Extremities have no cyanosis, clubbing, or edema. Which of the following is the best test to diagnose this patient’s condition?

1. ☐ Abdominal and pelvic X-ray
2. ☐ Abdominal CT scan ☒
3. ☐ Urinalysis and urine culture
4. ☐ Abdominal ultrasonogram
5. ☐ Intravenous pyelography

**INCORRECT** ☐

**The correct answer is 2.**

This patient is afebrile and presents with pain radiating to the groin, nausea, vomiting, and a soft abdomen. This is most consistent with renal colic from an obstructed urinary stone. Patients typically present with severe flank or abdominal pain radiating to the groin, accompanied by nausea and vomiting. Unlike patients with an acute abdomen, patients with urinary stones are often writhing in pain and unable to sit still in the exam room (these patients do not have peritoneal irritation so movement does not worsen their pain). The first-line modality for diagnosing a urinary stone is a non-contrast spiral CT of the abdomen and pelvis. This test can be obtained relatively quickly and will visualize calcium stones and the majority of noncalcium stones.

**(Choices 1 & 4)** Abdominal and pelvic X-ray will identify radiopaque, calcium-containing stones. Other types of urinary stones, accounting for at least 15% of cases, are not visible on plain X-ray. Also, this method can miss small stones and gives no information about obstruction. CT is a more sensitive and specific imaging test. Ultrasonography can be used if the patient is pregnant to reduce radiation exposure. However, this can also miss some small stones.

**(Choice 3)** The urinalysis of patients with urinary stones will reveal microscopic or gross hematuria in over 90% of patients. However, the presence of hematuria is non-specific. It is important to make sure that patients with urinary calculi do not have coexistent urinary tract infections because this significantly changes management; however, this patient does not have a history of fever or dysuria to suggest an infection.

**(Choice 5)** An intravenous pyelogram (IVP) uses IV contrast and plain X-ray to visualize the urinary system. IVP was the test of choice in the past for diagnosing urinary stones but, because of the risk of contrast-related reactions with IVP, non-contrast CT is now the preferred test.

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118. Question

1 points

**Category: Surgery**

A 57-year-old man is undergoing a femoral-popliteal bypass of his right lower extremity because of severe peripheral vascular disease. This patient has a longstanding history of claudication and shortness of breath. He had a myocardial infarction 3 years ago and has had progressive limitation of his exercise capacity because of his peripheral vascular disease. He has not had any risk stratification after his infarction. Two weeks ago, he underwent a lower extremity arterial study that showed severe diffuse disease of his right leg arterial system. The patient is brought to the operating room, and, during the procedure, his right lower extremity is made bloodless by application of a thigh tourniquet for 1.5 hours. The surgeons complete their bypass and are preparing to restore blood flow. Which of the following is an expected consequence of this maneuver?

1. ☐ Decrease in blood pressure ☐
2. ☐ Increase in cardiac output
3. ☐ Increase in preload
4. ☐ Increase in venous return
5. ☐ Sinus bradycardia

**INCORRECT** ☐

**The correct answer is 1.**

Vascular surgical patients are often managed by the medical consult service because of the tremendous number of co-morbidities. During vascular procedures, the use of cross-clamping and tourniquets produces localized or regional ischemia. The consequences of ischemia include the accumulation of metabolic waste products and acid load (so-called evil humors), which are freely available to wreak havoc on the systemic circulation once they gain access to it. The primary consequence of this is profound and dramatic systemic hypotension that can be prolonged for hours after a procedure. Such a phenomenon has obvious consequences for management of patients such as this man with coexisting cardiac disease.

**(Choices 2 & 3)** A drop in systemic blood pressure from severe vasodilatation will lead to decreased preload and thus a decrease in stroke volume and cardiac output.

**(Choice 4)** Restoration of circulation to the previously clamped limb opens an entirely new venous reservoir, thus dramatically reducing venous return (compare with. In addition, the massive systemic vasodilatation would further decrease venous return. The result of these two events is a dramatic, and often profound, drop in systemic blood pressure.

**(Choice 5)** is the opposite of the reflex tachycardia that is expected with profound hypotension.

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119. Question

1 points

**Category: Surgery**

A 44-year-old woman has a 2-cm firm palpable mass in the upper outer quadrant of her right breast. The mass is freely movable, and her breast is of normal, rather generous size. There are no palpable axillary nodes. Mammogram shows no other lesions. A core biopsy establishes a diagnosis of infiltrating ductal carcinoma. She has no neurologic or skeletal symptoms, and a chest x-ray film and liver enzymes are normal. She understands that systemic therapy may eventually be needed once the full extent of her disease is known. Although she wants the best chance for cure, she is very concerned about cosmetic deformity and wants to know what can be done about the breast itself. Which of the following is the most appropriate management?



1. ☐ Radiation and chemotherapy without breast surgery
2. ☐ Lumpectomy, axillary sampling, and postoperative radiation ☐
3. ☐ Simple total subcutaneous mastectomy with implants
4. ☐ Modified radical mastectomy with immediate rectus abdominis flap reconstruction
5. ☐ Radical mastectomy and postoperative radiation, with delayed reconstruction

**INCORRECT** ☐

**The correct answer is 2.**

This is actually the ideal candidate for breast-sparing surgery: a patient with a small primary tumor in a large breast, located far away from the nipple and areola. Provided radiation is done afterward, the cure rates are identical to those for more mutilating procedures. The cosmetic outcome is excellent, and no reconstruction is needed (the void left by the lumpectomy fills in with body fluids and is eventually replaced by connective tissue).

**(Choice 1)** No surgery at all is not an option. As much as we want to preserve the breast, and as much as we rely on postoperative radiation to lower the local recurrence rates, leaving the primary tumor in place does not lead to cure.

**(Choice 3)** Simple mastectomy entails more surgery than needed for the tumor (for which a lumpectomy followed by radiation is sufficient in this case), but not enough to learn about the status of the axillary nodes. They have to be sampled (either by dissection or sentinel node biopsy). Physical examination is totally unreliable for that purpose.

**(Choice 4)** Although modified radical mastectomy may be unavoidable in patients with larger primary tumors in smaller breasts, or tumors located where the nipple and areola cannot be preserved, this patient does not need that larger operation (no survival advantage) and should not take the more complicated and less pleasing breast reconstruction.

**(Choice 5)** Old-fashioned radical mastectomy is unnecessarily aggressive and not justified unless the tumor is huge and invading the pectoralis muscle. Unless surgical margins are positive for tumor, postoperative radiation would-be equally unnecessary if the whole breast is taken.

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120. Question

1 points

**Category: Surgery**

While on call in the ED, you are contacted by the medical team to see a patient with bright red blood per rectum. The patient is a 67-year-old male who was admitted 3 days ago for pneumonia. Approximately 3 hours prior to your being contacted, the patient complained of abdominal pain that was followed by passage of a large amount of stool containing gross blood. Vital signs are as follows: T 37.5°C, BP 115/76, HR 95, and SaO<sub>2</sub> 92% on 2 L by nasal cannula. Your exam reveals an alert and responsive patient in no apparent distress. Cardiopulmonary exam reveals a regular

heart rate and rhythm, skin warm and pink throughout, decreased breath sounds, and dullness to percussion in the right lower lung field. The abdominal exam is unremarkable. What is the most appropriate first step in management of this patient?

1. ☐ Exploratory laparotomy
2. ☐ Endoscopy ☒
3. ☐ Tagged RBC scan
4. ☐ CT scan
5. ☐ Angiography

**INCORRECT** ☐

**The correct answer is 2.**

Acute lower gastrointestinal (GI) hemorrhage is defined as continuous bleeding from the rectum, with or without hemodynamic instability. Aggressive fluid resuscitation should be initiated in an ICU setting during work-up of the etiology. A nasogastric tube should be inserted and aspirated to eliminate the possibility of a massive upper GI bleed. Endoscopy, including colonoscopy and esophagogastroduodenoscopy, is a critical step in the management of a lower GI bleed. Cautionization can be therapeutic if the site of active bleeding is identified. Colonoscopy is successful in localizing the bleeding site(s) in 50% to 90% of cases, according to clinical trials.

**(Choice 1)** Exploratory laparotomy may be required in an unstable patient or after unsuccessful endoscopy. If the source of bleeding is not localized, a total colectomy may be the only option.

**(Choice 3)** Tagged RBC scans may be obtained to localize the bleeding following a negative endoscopy in a stable patient. Unfortunately, localization with this procedure is not entirely dependable. If the scan is positive, the patient should proceed to angiography for further delineation and treatment.

**(Choice 4)** A CT scan would yield little information in an acute intestinal bleeding scenario.

**(Choice 5)** Angiography may be used to localize the bleeding vessel and treat it with embolization. This technique is best employed following localization with a tagged RBC scan.

121. Question

1 points

**Category: Surgery**

1. A 35-year-old man comes to the physician because of persistent dull perineal pain and dysuria for 6 months. The patient denies urinary tract infections or urethral discharge. His temperature is 37.0 C (98.6 F). On digital rectal examination, the prostate is slightly tender and boggy but not enlarged or indurated. Urinalysis is normal. Expressed prostatic secretions show the following:

**Leukocytes:** 30 cells/high power field

**Bacteria:** None

Cultures of prostatic secretion and urine are negative for bacteria. Which of the following is the most likely diagnosis?

1. ☐ Acute cystitis
2. ☐ Acute prostatitis
3. ☐ Chronic bacterial prostatitis
4. ☐ Chronic nonbacterial prostatitis ☐
5. ☐ Prostatodynia

**INCORRECT** ☐

**The correct answer is 4.**

Chronic nonbacterial prostatitis is characterized by persistent irritative voiding symptoms, such as dysuria and perineal discomfort, and leukocytes (especially foamy macrophages) in expressed prostatic secretion. No bacteria, however, are isolated from cultures of urine or prostatic secretions. This condition is believed to be of a noninfectious nature and possibly autoimmune-mediated. Treatment is based on symptomatic relief with sitz baths and antiinflammatory agents. However, some authors recommend a trial with erythromycin.

**(Choice 1)** is usually infectious, so that irritative voiding symptoms are associated with positive urine cultures. Coliform bacteria are the usual pathogens. In men, prostatic hyperplasia is the most common predisposing factor.

**(Choice 2)** is due to bacterial infection. Perineal pain, irritative voiding symptoms, extreme tenderness on digital rectal examination, and fever are the presenting symptoms. Urine cultures are positive for the offending agents, which are gram-negative rods (*Escherichia coli* and *Pseudomonas aeruginosa*).

**(Choice 3)** Chronic nonbacterial prostatitis must be differentiated from chronic bacterial prostatitis. Both disorders present with similar symptomatology, but chronic bacterial prostatitis is associated with positive bacterial cultures of expressed prostatic secretions. Gram-negative rods are the most common pathogens. Treatment is based on antibiotic therapy as determined by susceptibility tests on the isolated organisms.

**(Choice 5)** is an obscure entity characterized by dull perineal discomfort and pain mimicking chronic prostatitis. Microscopic examination and cultures of prostatic secretions, however, are negative for leukocytes and bacteria. The designation itself is a misnomer, since the prostate is entirely normal. The disease seems to be related to dysfunctional contractility of the bladder detrusor muscle, the sphincter, and/or the urethra. The treatment is symptomatic and includes alpha-blocking agents, diazepam (as a myorelaxant), biofeedback techniques, and sitz baths.

**Category: Surgery**

A 23-year-old man is brought to the emergency department after being involved in a motor vehicle collision. He has multiple organ injuries and is listed in critical condition. Physical examination shows an open wound in the right lower extremity and significant blood loss. He is in hypovolemic shock. Which of the following is the first parameter to change in hypovolemic shock?

1. ☐ Systolic blood pressure
2. ☒ Pulse rate
3. ☐ Respiratory rate
4. ☐ Level of consciousness
5. ☐ Skin vasoconstriction

**INCORRECT** ☐

**The correct answer is 2.**

Hemorrhagic shock may be divided into four classes based on the amount of blood loss. Each class is typified by clinical findings that correlate with the degree of hemorrhage. A patient with a class I hemorrhage has lost less than 15% of his intravascular volume. Patients with a class I hemorrhage are generally alert but may feel anxious. The blood pressure is normal and the major organs are satisfactorily perfused as evidenced by a normal urine output. The patient compensates for blood loss through a sympathetic response that induces tachycardia and peripheral vascular constriction. Patients with a class II hemorrhage have lost between 15 and 30% of their blood volume. Patients with class II hemorrhage are generally more agitated. While the mean arterial blood pressure remains normal, the pulse pressure is narrowed. Urine output is slightly decreased and the skin is cool and moist. All of these manifestations can be attributed to further increases in sympathetic discharge and shunting of blood from less critical vascular beds such as the skin. Patients with class III hemorrhage have lost 30–40% of their blood volume and can no longer maintain their blood pressure at normal levels despite further increases in heart rate and peripheral vascular constriction. Patients will begin to have a decreased level of consciousness and a further decrease in urine output due to poor cerebral and renal perfusion, respectively. Class IV hemorrhage is defined as a blood loss of more than 40% of the blood volume. At this point, circulatory failure and death are imminent without therapeutic intervention.

**(Choice 1)** The systolic blood pressure in hemorrhagic shock does not typically decrease until at least 30% of the intravascular volume has been lost (Class III and IV).

**(Choice 3)** The respiratory rate is not affected directly by hemorrhage, but the patient will become tachypneic with a class III and IV hemorrhage.

**(Choice 4)** While patients may be anxious or agitated early in a hemorrhagic episode, the level of consciousness is typically not altered until greater than 30% of the circulating volume has been lost (Class III and IV).

**(Choice 5)** Vasoconstriction of the skin is typically seen once a patient loses more than 15% of their intravascular volume (Class II). The periphery will appear cold and mottled, and capillary refill will also worsen with continued blood loss.

### 123. Question

1 points

#### Category: Surgery

A 53-year-old woman presents with a history of a painless lump in the region of the right parotid gland. The lump has been present for about 6 years and has recently started growing in size. Her husband says that her speech has started to sound “funny.” Examination reveals a firm, nontender mass with early evidence of peripheral facial nerve palsy. No lymphadenopathy is noted in the neck. Which of the following is the most likely diagnosis?

1. ☐ Adenoid cystic carcinoma
2. ☐ Adenolymphoma
3. ☐ Pleomorphic adenoma ☐
4. ☐ Mucoepidermoid carcinoma
5. ☐ Acinic cell carcinoma

**INCORRECT** ☐

**The correct answer is 3.**

This patient has a pleomorphic adenoma (also known as a mixed parotid tumor). It is the most common tumor affecting the salivary glands, accounting for approximately 70% of parotid tumors and 50% of all salivary gland tumors. Pleomorphic adenomas are essentially benign and, as in this patient, are often present for more than 6 years. Malignancy can develop and is heralded by a sudden increase in size, pain, and infiltration into the facial nerve, where it traverses the gland.

**(Choice 1)** is the most common malignant tumor of minor salivary glands and has a tendency to invade perineural tissue. As a result, the patient presents with pain, paralysis of muscles, and areas of anesthesia over involved skin. The tumor may even invade bone, without evidence of it on initial radiography. Thus, like an iceberg, it is far more extensive than encountered on physical examination or perceived on radiography.

**(Choice 2)** Also called Warthin’s tumor, is the second most common benign tumor of the salivary glands, and it is almost always located in the parotid gland. It most often is cystic and usually affects middle-aged or elderly males. More than one tumor may be found in one or

both parotid glands. Mucoepidermoid

**(Choice 4)** is the most common malignant tumor of the parotid glands. It has varying degrees of differentiation and growth; the greater the squamous component, the worse the prognosis. When mucoepidermoid carcinoma occurs in the parotid gland, it does not usually cause facial nerve paralysis, because local invasion is limited. Metastasis is also limited to the local lymph nodes.

**(Choice 5)** is a rare malignant tumor that is more common in women than in men. It is most commonly located in the parotid gland. It is slow growing, tends to be soft, is locally invasive, and may metastasize.

## 124. Question

1 points

### Category: Surgery

A patient involved in a car accident sustains burst fractures of several thoracic vertebral bodies. At the time of admission, he has no neurologic function at all below the level of the injury and he has flaccid sphincters. After a few days, there is partial recovery of function; the remaining deficits are loss of motor function and loss of pain and temperature sensation on both sides distal to the injury, with preservation of vibratory and positional senses. Which of the following is the most likely diagnosis?

1. ☐ Anterior cord syndrome ☒
2. ☐ Central cord syndrome
3. ☐ Complete cord transection
4. ☐ Cord hemisection
5. ☐ Spinal shock

**INCORRECT** ☐

**The correct answer is 1.**

The mechanism of injury suggests anterior cord syndrome, because the burst vertebral bodies are more likely to damage the anterior part of the cord that lies right behind them. The final neurologic deficits confirm it, since the only preserved functions are those that travel in the posterior part of the cord.

**(Choice 2)** is seen with hyperextension injuries of the neck, resulting in severe deficits in the upper extremities but better preservation of function in the lower extremities.

**(Choice 3)** would have no function at all below the level of the lesion.

**(Choice 4)** Hemisection would have the classic “split deficits,” i.e., below the lesion some functions are affected on one side and a different set of functions are affected on the other.



(Choice 5) was present in this patient right after the injury (nothing worked), but it is not the final lesion.

125. Question

1 points

Category: Surgery

A 34-year-old man comes to the emergency department because of severe pain in his penis. He was having sex with his wife on top when he had sudden onset severe pain in the penis at the height of orgasm. Swelling of the penis and deviation of the penile shaft to the right followed the pain. Examination shows a man in severe distress. The penis is uncircumcised, grossly swollen and deviated to the right. There is no blood at the urethral meatus. Which of the following is the most appropriate next step in management?

1. ☐ Surgical exploration of penis
2. ☐ Retrograde urethrogram followed by surgical exploration of penis ☐
3. ☐ Foley's catheterization
4. ☐ Antibiotics, analgesics and anti-inflammatory and follow up in 24 hours
5. ☐ Do a circumcision

INCORRECT ☐

**The correct answer is 2.**

This patient exhibits a classic presentation of penile fracture. The penis, due to its mobility in the flaccid state, is typically not injured in cases of blunt trauma. It is far more vulnerable to trauma in its erect state, such as during sexual intercourse, and this is the setting where penile fracture is most commonly encountered. This injury most often occurs during intercourse where the woman is situated on top of the man because the penis may emerge from the vagina in this position and be subsequently injured in a bending fashion between its rigid fixation on the male and the downwardly moving female perineum. Patients typically complain of a snapping sensation and a sound when the injury occurs followed by severe pain. The injury and associated snapping sensation results from tearing of the tunica albuginea, which invests the corpus cavernosum. A hematoma rapidly forms at the site of injury causing bending of the shaft of the penis at the site of the fracture. Treatment is with an emergent urethrogram to assess for urethral injury as well as emergent surgery to evacuate the hematoma and mend the torn tunica albuginea.

**(Choices 1 & 3)** Surgical exploration is the treatment of choice for penile fracture, but it should always be preceded by a retrograde urethrogram to rule out a urethral injury. This is important because an occult urethral injury may be exacerbated by placement of a Foley catheter.

**(Choice 4)** There is no role for a conservative approach in the treatment of penile fracture; emergent urethral imaging and surgical correction is the only acceptable treatment.

**(Choice 5)** Circumcision is the treatment of choice for phimosis, paraphimosis and Zoon's balanitis. It is also associated with a lower risk of squamous cell carcinoma of the penis, but it has no role in the treatment of penile fracture.

126. Question

1 points

**Category: Surgery**

A 23-year-old man is brought to the emergency department in an obtunded state following a gunshot wound to the right upper quadrant of the abdomen. His systolic blood pressure is 60 mm Hg and unable to obtain diastolic blood pressure. His pulse is 136/min. Chest auscultation shows clear heart and breath sounds. The abdomen appears distended, and there is an obvious gunshot wound on the right upper quadrant. The bowel sounds are decreased. Which of the following is the most appropriate next step in management?

1. ☐ A Angiography
2. ☐ B Diagnostic peritoneal lavage
3. ☐ C Focused ultrasonography
4. ☐ D Laparoscopy
5. ☐ E Laparotomy ☐

**INCORRECT** ☐

**The correct answer is 5.**

The patient described has suffered penetrating abdominal trauma in the right upper quadrant, where it is likely that the liver or hepatic flexure of the colon may be injured. He is in hemodynamic shock, as evidenced by his low systolic blood pressure, obtunded mental status, and abdominal distention. Furthermore, there is a high likelihood of intraperitoneal hemorrhage resulting from injury to the liver. All hemodynamically unstable patients with sharp penetrating abdominal trauma and gunshot wounds that are believed to have entered the peritoneum must be treated with emergent exploratory laparotomy in order to prevent the development of sepsis resulting from hollow organ perforation and to prevent exsanguinating hemorrhage.

**(Choices 3 & 5)** (Choices C and G) Exploratory laparotomy should not be delayed for imaging procedures in hemodynamically unstable patients following penetrating abdominal trauma.

**(Choice 4)** Laparoscopy may be used in the assessment of hemodynamically stable patients who have suffered penetrating abdominal trauma in which injury to a hollow viscus or other organ cannot be readily determined clinically.

**(Choice 2)** Peritoneal lavage is utilized to detect intraperitoneal bleeding in cases of blunt abdominal trauma, when ultrasound is not available for a fast exam.

127. Question

1 points

**Category: Surgery**

A 65-year-old man with a long history of coronary artery disease and recent history of myocardial infarction is seen in the emergency room with a history of sudden onset of pain in the right leg. The patient also complained of numbness in the leg. Physical examination revealed pallor of the right leg, the skin was cool to the touch, and the patient had difficulty in moving his toes. Raising his leg increased the pallor, and the dorsalis pedis pulse could not be felt. These symptoms most likely represent which of the following abnormalities?

1. ☐ Superficial thrombophlebitis
2. ☐ Herniation of a lumbar disk
3. ☐ Arterial occlusion ☐
4. ☐ Deep venous insufficiency
5. ☐ Hypovolemic shock

**INCORRECT** ☐

**The correct answer is 3.**

The patient has an acute arterial occlusion, which is associated with the six P's—Pain, Pallor, Paresthesias, Paralysis, Poikilothermia, and Pulseless (absence of pulse). The most likely cause is an embolus, but trauma could also be responsible. In an embolic arterial occlusion, there is no antecedent history of claudication pain. Emboli can spring from a recent myocardial infarct, mitral stenosis, artificial heart valve, or an aortic aneurysm. The condition occurs suddenly. The limb is cold to touch, and loss of motor function generally ensues within hours after onset of pain. For this reason, embolic arterial occlusion is an emergency. The first loss of function is the inability to move the toes. (In the case of venous occlusion, on the other hand, motor function is not lost.) Heparinization followed by embolectomy and thrombectomy is the preferred treatment. The popliteal artery is the most susceptible vessel for occlusion because it is commonly affected by atherosclerosis and is a small-caliber artery.

**(Choice 1)** in the saphenous system of the legs presents with pain and tenderness along the course of the vessel.

**(Choice 2)** would not be expected to involve the whole leg, nor would it present with the given symptom/sign complex. A history of back pain followed by pain going down the leg (radicular pain) would be usual. Findings would include hypesthesia along the lateral or inner aspect of the leg, depending on which intervertebral disk has herniated, and weakness of the plantar or dorsiflexors of the foot. Sciatic stretch sign would be positive, and the deep tendon jerks may or may not be affected, depending on the level of herniation. The pulses will be normal, and skin temperature would be normal.

**(Choice 4)** is associated with superficial varicose veins and stasis dermatitis around the ankle.

**(Choice 5)** produces hypotension, generalized pallor, and cold, clammy skin.

## 128. Question

1 points

### Category: Surgery

A 12-year-old boy is brought to the emergency department after being involved in a motor vehicle collision. He is in no distress and is admitted for observation. Two hours after admission, he develops tachypnea and tachycardia. His temperature is 36.7 °C (98 °F), blood pressure is 110/66 mm Hg, pulse is 110/min, and respirations are 22/min. Examination shows bruises on the right side of the chest, but palpation of the ribs does not elicit pain or suspicion for rib fractures. Breath sounds are decreased on the right side. ABG on 6 liters of oxygen shows P<sub>O2</sub> of 60 mm Hg, P<sub>CO2</sub> of 32 mm Hg, and pH of 7.32. An x-ray film of the chest shows a patchy irregular alveolar infiltrate in the right middle and lower lobes. Which of the following is the most likely diagnosis?

1. ☐ Adult respiratory distress syndrome
2. ☐ Aspiration pneumonia
3. ☐ Fat embolism
4. ☐ Hemothorax
5. ☐ Pulmonary contusion ☐

**INCORRECT** ☐

**The correct answer is 5.**

Pulmonary contusion represents parenchymal bruising of the lung, which may or may not be associated with rib fractures. The clinical manifestations develop usually in the first 24 hours (often within few minutes); tachypnea, tachycardia, and hypoxia are characteristic. Physical examination typically reveals chest wall bruising and decreased breath sounds on the side of pulmonary contusion. Chest x-ray reveals patchy irregular alveolar infiltrate and a CT scan

may be employed to make an early diagnosis. ABG typically shows hypoxemia and, itself, is an indication to suspect pulmonary contusion in trauma patients. This is very important to differentiate pulmonary contusion from adult respiratory distress syndrome (ARDS)

**(Choice 1)** ARDS usually manifests 24-48 hours from the trauma; besides that, bilateral lung involvement is present.

**(Choice 2)** Pulmonary aspiration may be unilateral or bilateral and fever and inflammatory reaction are characteristic.

**(Choice 3)** Fat embolism occurs after long bone fractures. The clinical picture includes tachypnea, tachycardia, hypotension, mental changes, thrombocytopenia, and petechiae.

**(Choice 4)** Hemothorax is detected on chest radiograph as pleural effusion and, if significant, hypotension is present.

## 129. Question

1 points

### Category: Surgery

A 35-year-old man with a long history of dyspepsia experiences sudden onset of severe epigastric distress with associated pain in the right shoulder. Physical examination reveals a patient who appears ill and who has a rigid, quiet abdomen with rebound tenderness. Which of the following is the most appropriate first step in the management of this patient?

1. ☐ Order a barium study of the upper gastrointestinal system.
2. ☐ Order upright and supine abdominal films. ☐
3. ☐ Perform a peritoneal lavage.
4. ☐ Administer antacids.
5. ☐ Do an exploratory laparotomy.

**INCORRECT** ☐

**The correct answer is 2.**

About 5% of ulcer patients develop perforations, most commonly on the anterior wall of the stomach or duodenum, and more commonly in males than in females. The incidence of perforations is increasing; it has been hypothesized that this is due to increased use of nonsteroidal anti-inflammatory drugs (NSAIDs) and/or crack cocaine. Perforation of a peptic ulcer is characterized by the sudden onset of epigastric pain with radiation of the pain into the right shoulder, which results from irritation of the phrenic nerve (C4) from air underneath the diaphragm. Abdominal rigidity, rebound tenderness, and ileus occur as a result of chemical peritonitis. The first step in management is to obtain an upright and supine film of the abdomen, which shows air beneath the diaphragm in 75%–85% of cases; the presence of air establishes a diagnosis. Intravenous cefazolin is given as prophylaxis against infection.

Surgical intervention is necessary. Modern, minimally invasive laparotomy techniques coupled to postoperative treatment of possible *Helicobacter pylori* infection has reduced the overall mortality to about 5%.

**(Choice 1)** One cannot conclude that there is no perforation if air is not present beneath the diaphragm; as a consequence, a follow-up upper gastrointestinal series should be done. However, barium studies should not be performed in patients with suspect perforation.

**(Choice 3)** is usually indicated in the workup of intraabdominal bleeding.

**(Choice 4)** Antacids are not indicated in the treatment of peptic ulcer perforation.

**(Choice 5)** Exploratory surgery is not the initial step in management of abdominal pain.

### 130. Question

1 points

#### Category: Surgery

A 65-year-old man comes to the physician four years after suffering a burn injury to his entire right leg. One area of the leg never healed and has now started increasing in size. He has constant pain and drainage from the site of the lesion. Several topical creams and antibiotics have not helped. Biopsy of the lesion is attempted. Which of the following is most likely to be identified on biopsy?

1. ☐ Malignant melanoma
2. ☐ Squamous cell carcinoma ☐
3. ☐ Basal cell carcinoma
4. ☐ Dysplastic nevus
5. ☐ Actinic keratosis

**INCORRECT** ☐

**The correct answer is 2.**

The diagnosis of malignancy should be suspected in all non-healing wounds. Squamous cell carcinoma (SCC) may arise within chronically wounded, scarred or inflamed skin. SCC arising within burn wounds is known as a Marjolin's ulcer. SCC has also been described arising in the skin overlying a focus of osteomyelitis, radiotherapy scars and venous ulcers. SCC arising within chronic wounds tend to exhibit more aggressive behavior, so early diagnosis is key to preventing metastatic disease in such patients. A biopsy should be obtained in all chronic wounds failing to heal in order to rule out malignancy.

**(Choice 1)** Malignant melanoma does not classically occur in chronic wound sites. Patients with melanoma typically present with a nevus that has increased in size, changed color, become palpable or become symptomatic (painful, pruritic or bleeding).

**(Choice 3)** Basal cell carcinoma classically presents on chronically sun-exposed skin. The lesions are usually pearly telangiectatic papules with a central "rodent" ulceration.



**(Choice 4)** Dysplastic nevi are melanocytic nevi exhibiting characteristics not seen in standard nevocytic nevi. Clinical characteristics include size greater than 6mm, irregular borders and irregular pigmentation. Histologically, such lesions demonstrate varying degrees of architectural disorder and cytologic atypia. These nevi are usually monitored clinically and do not occur in previous wounds.

**(Choice 5)** An actinic keratosis is a precursor lesion to squamous cell carcinoma. These are common on chronically sun-exposed skin.

### 131. Question

1 points

#### Category: Surgery

A 31-year-old male is brought to the emergency department after being involved in a motor vehicle collision as an unrestrained passenger. He was given 3L of normal saline in the ambulance on his way to the hospital and has been receiving 5 U/min of oxygen by nasal cannula. He is agitated and moves all four extremities spontaneously. His blood pressure is 85/55 mmHg and his heart rate is 120/min. His respiratory rate is 30/min. His pupils are symmetric and reactive to light. His neck veins are flat and his trachea is shifted slightly to the right. Over the left hemithorax, breath sounds are absent and there is dullness to percussion. Which of the following diagnoses is most likely?

1. ☐ Tension pneumothorax
2. ☐ Lung contusion
3. ☐ Lung atelectasis
4. ☐ Hemothorax ☐
5. ☐ Diaphragmatic rupture

**INCORRECT** ☐

**The correct answer is 4.**

This patient has likely suffered blunt chest trauma based on his history. On presentation, he is hypotensive, tachycardic and tachypneic after receiving 3L of IV crystalloid and supplemental oxygen. These findings are consistent with hemorrhagic shock. A systolic blood pressure less than 90, heart rate ~ 120, and respiratory rate ~ 30 are signs consistent with Class 11-111 hemorrhagic shock, resulting from loss of around 30% of the circulating blood volume. The patient's blood loss is most likely internal as there is no indication of external hemorrhage. Of the choices given, only a hemothorax can account for such significant internal hemorrhage. Each hemithorax is capable of holding up to 50% of the circulating blood volume, and massive hemothorax is defined as > 1.5L. This diagnosis is further supported by the physical examination. Flat neck veins are consistent with hypovolemia. A large left-sided hemothorax could cause some tracheal deviation to the right

and reduced breath sounds and dullness to percussion over the involved side. The most common causes of massive hemothorax are traumatic laceration of the lung parenchyma or damage to an intercostal or internal mammary artery.

**(Choice 1)** A left-sided tension pneumothorax could produce hypotension, tachycardia, and tachypnea with tracheal deviation to the right but would reveal decreased breath sounds with hyperresonance to percussion over the left hemithorax.

**(Choices 2 & 3)** With atelectasis or pulmonary contusion, one would expect some degree of tachypnea and possibly tachycardia (compensating for hypoxemia) but not hemorrhagic shock as in this patient.

**(Choice 5)** Diaphragmatic rupture can produce tachypnea due to unilateral hypoventilation, especially if there is herniation of abdominal contents into a hemithorax. This diagnosis is often delayed or missed due to its sometimes subtle presentation.

### 132. Question

1 points

#### Category: Surgery

While playing football, a college student injures his shoulder. He comes in with his arm held close to his body, complaining of pain over the clavicle, rather than the shoulder joint. Physical examination shows a normal shoulder, but there is point tenderness at the junction of the middle and distal thirds of the clavicle. Gentle pressure elicits a gritty feeling of bone crunching on bone. He has normal pulses on that arm. After appropriate x-ray studies are performed, which of the following is the most appropriate initial step in management?

1. ☐ Analgesics only
2. ☐ Immobilization by a figure-eight device ☐
3. ☐ Immobilization by hanging cast
4. ☐ Arteriogram of the subclavian vessels
5. ☐ Open reduction and internal fixation

**INCORRECT** ☐

**The correct answer is 2.**

Clinically, this is a classic presentation for fracture of the clavicle, at the point at which they usually occur. As with most fractures, some kind of immobilization is required, and this is achieved with a figure-eight device.

**(Choice 1)** Analgesics with no immobilization of any kind would be painful and disruptive to the healing process, an obviously incorrect choice for the clavicle (but a reasonable option in bones that are more-or-less kept in place by other anatomic structures, such as the ribs).

**(Choice 3)** Hanging casts are used when the arm has to be kept pulled down, a position that would not help this broken clavicle.

**(Choice 4)** The subclavian vessels are at risk in sternoclavicular dislocations with posterior displacement, which is not the injury here, so an arteriogram is not necessary.

**(Choice 5)** As a general rule, open reduction and internal fixation are required only when very precise alignment of bone fragments is required, or when proper reduction and immobilization cannot be achieved by more conservative means.

133. Question

1 points

**Category: Surgery**

A 38-year-old woman comes to the emergency department because of the sudden onset of severe abdominal pain. The pain started one hour ago in the epigastrium but now it is mostly localized to the lower abdomen. She has some nausea but denies any vomiting. Her last menstrual period (LMP) was 25 days ago. Her temperature is 36.8 °C (98.1 °F), blood pressure is 160/90 mm Hg, pulse is 110/min, and respirations are 25/min. The abdomen is tender on palpation with prominent guarding and positive rebound. There is no shifting dullness, and bowel sounds are absent. Laboratory studies show:

**Hb:** 13.1 g/dl

**Hct:** 43%

**WBC:** 10,900/mm<sup>3</sup>

Which of the following is the most appropriate next step in management?

1. ☐ Abdominal CT scan
2. ☐ Diagnostic peritoneal lavage
3. ☐ Pelvic ultrasound
4. ☐ Pregnancy test ☐
5. ☐ Upright abdominal X- ray

**INCORRECT** ☐

**The correct answer is 4.**

This woman has clear signs of peritoneal irritation shortly after the onset of her abdominal pain. Most likely, a peptic ulcer has perforated, and highly irritating stomach or duodenal contents have spilled into peritoneal cavity and have descended producing lower abdominal pain. However, a pregnancy test should be performed before exposing the patient to X-ray. Once the pregnancy test is negative, it is most appropriate to proceed with an upright abdominal X-ray to look for air under the diaphragm **(Choice 5)**.

(Choice 1) Abdominal CT scan can be used if plain X-ray is negative.

(Choice 2) Diagnostic peritoneal lavage is an invasive procedure and is not indicated as the initial test in this patient.

(Choice 3) Abdominal ultrasound is a good initial imaging study in females of childbearing age having abdominal pain if gynecological pathology is suspected or the patient is pregnant.

### 134. Question

1 points

#### Category: Surgery

A 23-year-old man is admitted to the hospital after being struck by a motor vehicle. The patient sustained a compound fracture of his left femur in the accident and has had moderate blood loss. He was admitted to the hospital, has been stabilized over the past few days, and is now preparing for physical therapy. His hematocrit is 24%. The man feels weak and fatigued and easily gets short of breath with mild exertion. Which of the following is the most appropriate next step in management?

1. ☐ Continue with physical therapy; no transfusion is indicated
2. ☐ Discontinue physical therapy until the patient recovers more of his strength
3. ☐ Transfuse fresh frozen plasma to a hematocrit goal of 30%
4. ☐ Transfuse packed red blood cells to a hematocrit goal of 30% ☐
5. ☐ Transfuse whole blood to a goal hematocrit of 30%

**INCORRECT** ☐

**The correct answer is 4.**

Transfusion of packed red cells [preparation of all the red cell mass from a pint of donated blood-it has no plasma or huffy coat and therefore no proteins (coagulation factors) or platelets] is one of the most frequent treatments executed by physicians. There exists in medicine a dogma of uncertain origin that states that anemic patients with a hematocrit less than 30% should be transfused with red cells until that value is attained. This rule is even more rigidly followed in patients with co-existing illness, such as cardiac or pulmonary disease. Although this "rule" is being called into question as incorrect by recent publications, it is still generally accepted that patients with acute bleeds, such as the one in this vignette, merit repletion of red cells if they are symptomatic from such a bleed.

(Choice 1) Continuing with physical therapy without transfusion is a choice favored by many physicians. This is because many people believe that a 23-year-old man will replete his own red cells over time. In this case, however, the patient is clearly symptomatic with even

minimal exertion. Therefore, his anemia is not benign and merits treatment. There is, of course, no reason to restore his pre-accident hematocrit, but he should be transfused to a level at which his symptoms would be lessened or abrogated (about 30%).

**(Choice 2)** Discontinuing physical therapy until the patient recovers more of his strength is not appropriate since the patient requires therapy to regain his strength, and the reason for his weakness likely relates to his acute anemia.

**(Choice 3)** Transfusion of fresh frozen plasma (PPP) to a hematocrit goal of 30% is incorrect. PPP is used to restore clotting factors. One unit generally increases plasma anticoagulation factors by 30%. Like all blood products, it is type-specific.

**(Choice 5)** Transfusion of whole blood to a goal hematocrit of 30% is not performed. Whole blood is the content of 1 pint of donated blood. It is unfiltered and contains plasma, platelets, white cells, and red cells. This product is usually processed so that each of these components are removed (except white cells) and used for transfusions in specific clinical situations.

### 135. Question

1 points

#### Category: Surgery

A 22-year-old woman is taken to the emergency department after she injures her foot. She had been standing on a chair changing a light bulb, when she accidentally stepped off the chair backward. She heard a cracking sound when she fell and developed pain and swelling behind the ankle. Her symptoms worsened when she tried to descend the stairs in her house. Physical examination demonstrates marked swelling behind her ankle, and her pain is exacerbated by plantar flexion and dorsiflexion of the hallus. Which of the following is the most likely diagnoses?

1. ☐ Anterior Achilles tendon bursitis
2. ☐ Calcaneal spur syndrome
3. ☐ Epiphysitis of the calcaneus
4. ☐ Fracture of the posterolateral talar tubercle ☐
5. ☐ Posterior tibial nerve neuralgia

**INCORRECT** ☐

**The correct answer is 4.**

This is a typical history for fracture of the posterior lateral talar tubercle; this fracture also occurs in basketball and tennis players who come down hard after a jump. This type of fracture is a fairly common foot injury that you should be able to clinically recognize. The diagnosis can be confirmed with lateral x-ray films of the ankle. Treatment is with immobilization in a cast for 4-6 weeks.

(Choice 1) would also cause pain behind the foot/ankle, but would develop more slowly.

(Choice 2) causes heel pain and usually develops slowly.

(Choice 3) is a painful cartilage break in the heel of young children in whom the two centers of ossification of the calcaneus have not yet fused.

(Choice 5) causes pain (sometimes burning) around the ankle and sometimes extending to the toes; the pain is worse on walking.

136. Question

1 points

Category: Surgery

A 46-year-old male is brought to the ER because of coffee ground emesis. He has a history of chronic hepatitis C and alcohol abuse. His temperature is 36.6 °C (97.9 °F), blood pressure is 120/70 mm Hg, pulse is 90/min and respirations are 14/min. He is oriented to time, place and person but somewhat sleepy. A flapping tremor is noted. His abdomen is soft, non-tender, and mildly-distended; liver and spleen are palpated below the costal margins; shifting dullness is present. Nasogastric tube aspiration shows bright red blood that was easily cleared with saline lavage. Endoscopy shows a fresh ulcer with a small adherent clot located high on the lesser curvature near the gastroesophageal junction. Non bleeding esophageal and gastric varices are also seen. Laboratory studies show:

**Hemoglobin:** 10.2 g/L

**MCV:** 105 fl

**Platelets:** 105,000/mm<sup>3</sup>

**Leukocyte count:** 4,500/mm<sup>3</sup>

**Prothrombin time:** 17 sec

**Aspartate aminotransferase (SGOT):** 78 U/L

**Alanine aminotransferase (SGPT):** 50 U/L

Which of the following is the most appropriate next step in management?

1. ☐ Sclerotherapy of the varices
2. ☐ Porto-systemic shunt
3. ☐ Esophageal and proximal gastric devascularization and splenectomy
4. ☐ Gastric resection, selective vagotomy and pyloroplasty
5. ☐ Conservative medical management ☐

INCORRECT ☐



**The correct answer is 5.**

The patient described has a variety of related medical issues. He most likely has cirrhosis due to his simultaneous alcoholism and hepatitis C infection. Cirrhosis predisposes to upper GI bleeding, which in this population may result from a variety of causes including varices, portal gastropathy, peptic ulcer disease (PUD) and Mallory-Weiss tears (retching). This patient has bleeding due to PUD that has stopped spontaneously. In patients with cirrhosis, upper GI bleeding can precipitate hepatic encephalopathy to the increased delivery of blood-derived protein to the small bowel. The patients flapping tremor and somnolent state indicate this diagnosis. Conservative management for his encephalopathy, ascites, portal hypertension and PUD is indicated at this point. This includes giving an intravenous proton pump inhibitor for PUD, oral lactulose for encephalopathy and careful diuresis for ascites. Once he is clinically stable propranolol should be used to decrease the portal venous pressure.

**(Choices 1 & 3)** Sclerotherapy, endoscopic band ligation and surgery are indicated after a patient has experienced a first episode of variceal bleeding, but these procedures are not recommended for prophylaxis.

**(Choice 2)** A portosystemic shunt connects the portal venous system to the systemic venous system. This can be accomplished surgically or with a TIPS procedure. These procedures are considered a last resort in variceal bleeding unresponsive to medical and endoscopic interventions and may worsen the encephalopathy in this patient.

**(Choice 4)** Surgery for PUD is only indicated for perforation, gastric outlet obstruction and bleeding that cannot be controlled with endoscopic therapy.

137. Question

1 points

**Category: Surgery**

An otherwise healthy 24-year-old man presents in the emergency department with very severe pain of recent onset in his right scrotum. THE pain is constant and began about 3 hours prior to his arrival. Physical examination shows a temperature of 39.4 C (103.0F) but is otherwise unremarkable, except for the scrotal area. The testis on the affected side is in the normal position; however, it appears to be swollen and is exquisitely tender to palpation. The cord above the testis is equally painful and tender. Urinalysis shows pyuria. Which of the following is the most appropriate next step in management?

1. ☐ Antiviral medication started within the hour
2. ☐ Scrotal sonogram and antibiotics ☐
3. ☐ Cystoscopy and bladder irrigation
4. ☐ Trans-scrotal biopsy and appropriate resection
5. ☐ Emergency surgery and bilateral orchiopexy

**INCORRECT** ☐

**The correct answer is 2.**

The clinical picture is that of acute epididymitis, which is treated with antibiotics. The differential diagnosis is with testicular torsion. Although all the details in this case point to epididymitis, the consequences of missing a diagnosis of testicular torsion are so dire that sonogram is always done to rule it out with certainty.

**(Choice 1)** Orchitis secondary to mumps could produce a painful testicle, and you might think of treating it with antivirals. In this patient, however, neither the history nor physical examination indicates that the parotids are swollen.

**(Choice 3)** Cystoscopy is included as a distracter to emphasize the point that instrumentation of the urinary tract should never be done when there are signs of current urinary tract infection.

**(Choice 4)** Testicular tumors (hinted at in are typically painless. If one were thought to be present, however, the correct way to biopsy it would be by inguinal orchiectomy, never by the trans-scrotal route.

**(Choice 5)** Surgery and orchiopexy would be the correct answer for testicular torsion, in which case the testicle would have been high and in a horizontal position, the cord would have been nontender, and neither fever nor pyuria would have been present.

138. Question

1 points

**Category: Surgery**

A 22-year-old man involved in a motor vehicle collision undergoes a prolonged operation to repair a left femur fracture and femoral artery injury. During the first night after surgery he has pain in the left leg. Despite adequate narcotics, his pain is unremitting; the pain is worse with passive leg movement. Examination shows a pale and swollen leg that is tender to the touch; pulses are palpable. Which of the following is the most appropriate next step in management?

1. ☐ Increase the dose of narcotics
2. ☐ Elevate the leg and place ice packs
3. ☐ Get an x-ray to make sure the femur fracture is not displaced
4. ☐ Go back to the operating room ☐

**INCORRECT** ☐

**The correct answer is 4.**

Compartment syndrome may be caused by direct trauma (hemorrhage), prolonged compression of an extremity or after revascularization of an acutely ischemic limb. Muscles of the extremity are encased in fascial compartments that do not allow for expansion of tissue. Blood flow at the capillary level relies on the pressure difference between the arterial and venous systems. Hemorrhage or edema within muscle causes increased pressure within the non-distensible fascial compartment. This increased pressure interferes with perfusion by disallowing passage of blood from the arterial system into the capillary beds of the affected muscles. This eventually leads to muscle necrosis. Patients with compartment syndrome classically complain of severe pain that is worsened on passive range of motion, paresthesias, pallor and paresis of the affected limb. Pressure in the compartments can be measured directly using a needle and pressure transducing catheter system. Pressures over 30 mm Hg may result in cessation of blood flow through the capillaries and should be treated emergently by fasciotomy.

**(Choice 1)** Increasing the dose of narcotics can be disastrous if compartment syndrome is not first ruled out.

**(Choice 2)** If compartment syndrome has been ruled out and the leg swelling is due to edema, then elevation and ice may be a good choice. After compartment syndrome is relieved by fasciotomy, the leg is always elevated as well.

**(Choice 3)** Displacement of the femur fracture would not cause severe pain unresponsive to narcotics or pallor. Compartment syndrome is the most acute cause of the patient's symptoms and should be addressed and ruled out first. An x-ray is not diagnostic of compartment syndrome.

139. Question

1 points

**Category: Surgery**

A 24-year-old woman develops moderate, generalized abdominal pain of sudden onset and shortly thereafter faints. At the time of evaluation in the emergency department, she has regained consciousness, is pale, and has a blood pressure of 95/70 mm Hg and a faint pulse rate of 90/min. The abdomen is mildly distended and tender, with normal bowel sounds. Her hemoglobin is 7 g/dL. There is no history of trauma, but it is suspected that she might be bleeding into her abdomen, and a diagnostic peritoneal lavage is performed. The study shows that there is free blood in the peritoneal cavity. She denies the possibility of pregnancy because she has been on birth control pills since the age of 14 and has never missed taking them. Pelvic examination is normal, and a pregnancy test is negative. At laparotomy, the surgeons are likely to find which of the following?

1. ☐ Bleeding ovarian follicle
2. ☐ Ruptured abdominal aortic aneurysm
3. ☐ Ruptured ectopic pregnancy

- 4. ☐ Ruptured hepatic adenoma ☐
- 5. ☐ Ruptured hepatic artery aneurysm

**INCORRECT** ☐

**The correct answer is 4.**

A known complication of long-standing use of birth control pills is the development of hepatic adenomas that may rupture and bleed.

**(Choice 1)** A bleeding ovarian follicle can give mild abdominal pain right at the midpoint of the menstrual cycle, but it would not produce bleeding of this magnitude.

**(Choice 2)** An abdominal aortic aneurysm would be very rare at this age, and bleeding typically begins retroperitoneally with excruciating back pain. Once the aneurysm ruptures into the peritoneal cavity, complete vascular collapse ensues.

**(Choice 3)** An ectopic pregnancy is the first thought when a sexually active young woman has spontaneous intra-abdominal bleeding, but in this case it has been ruled out by the history, the pelvic examination, and the pregnancy test.

**(Choice 5)** Other visceral aneurysms can indeed bleed, and have a tendency to do so during pregnancy. They are very rare and favor the splenic artery. They can also occur in the hepatic artery, but the odds are extremely low.

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140. Question

1 points

**Category: Surgery**

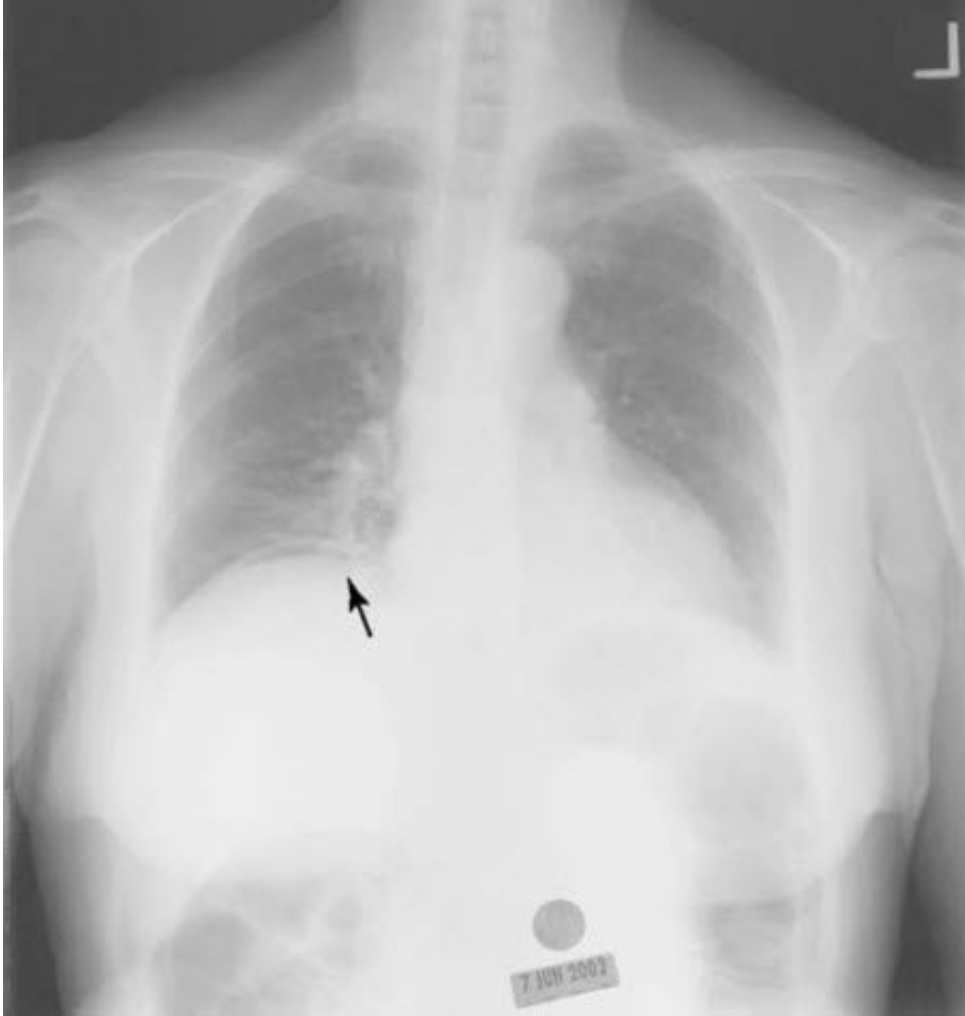
You are the general surgery intern on call at a busy university hospital. You are called by the ER physician to see a 57-year-old female complaining of abdominal pain. Six months ago the patient was diagnosed with metastatic breast cancer and she has been receiving chemotherapy, with her last dose being 6 days ago. The patient states that the abdominal pain started this morning and has become progressively worse, with multiple bouts of emesis. The patient's abdomen is very tender to the touch and demonstrates rebound tenderness throughout. The patient also denies flatus or a bowel movement. A CBC reveals

**WBC : 0.15K**

**HCT : 20%**

**PLT : 65,000**

A chest x-ray is obtained (image shown below). What is the most appropriate next step in this patient's management?



1. ☐ CT scan of the abdomen
2. ☐ Fluid resuscitation and pain control
3. ☐ Exploratory laparotomy ☒
4. ☐ Colonoscopy
5. ☐ Plan for discharge with narcotics

**INCORRECT** ☐

**The correct answer is 3.**

In the evaluation of an acute abdomen, the observance of pneumoperitoneum (i.e., “free air”) on the chest x-ray (note the arrow) or physical exam findings of peritonitis, including rebound tenderness, warrant an exploratory laparotomy. This is a surgical emergency; therefore, the other choices are inappropriate. No further radiologic evaluation is needed when a patient demonstrates peritoneal signs on physical exam and free air under the diaphragm on chest x-ray.

**(Choice 1)** Obtaining a CT scan will delay surgical treatment and will merely show the free air already noted on the chest x-ray.

**(Choice 2)** IV resuscitation and pain control are very appropriate, but not without an urgent laparotomy.

**(Choice 4)** Colonoscopy would delay treatment and possibly exacerbate the problem.

**(Choice 5)** Discharge is obviously not appropriate for a patient with an acute abdomen and free air.

141. Question

1 points

**Category: Surgery**

A 55-year-old male comes to the physician's office because of chronic pain in his buttock, hip and thigh muscles. The aching pain is present in both legs and usually is associated with walking. He has multiple medical problems and takes several medications. He has a 30 pack year smoking history. His temperature is 36.7 °C (98 °F), blood pressure is 150/88 mm Hg, pulse is 80/min and respirations are 16/min. Examination shows decreased femoral, popliteal and dorsalis pedis pulses in both legs. Which of the following additional complaints is most likely in this patient?

1. ☐ Snoring
2. ☐ Headache
3. ☐ Anorexia
4. ☐ Ankle swelling
5. ☐ Impotence ☐

**INCORRECT** ☐

**The correct answer is 5.**

The patient described is suffering from arterial occlusion at the bifurcation of the aorta into the common iliac arteries (aortoiliac occlusion, Leriche syndrome). Leriche syndrome is characterized by the triad of bilateral hip, thigh and buttock claudication, impotence and symmetric atrophy of the bilateral lower extremities due to chronic ischemia. Impotence is almost always present in men with this condition; in the absence of impotence, an alternate diagnosis should be sought. The pulse is soft or absent bilaterally from the groin distally in this condition. Men with a predisposition for atherosclerosis, such as smokers, are at the greatest risk of this condition. Because impotence is not uncommon in this age group, and the complaints of hip and thigh pain with walking may also be attributed to osteoarthritis, there is a risk of missing this diagnosis if a thorough vascular examination is not preformed.

**(Choice 1)** Snoring may be primary, which is not associated with underlying pathology, or it may be a symptom of obstructive sleep apnea.



**(Choice 2)** Temporal arteritis is associated with new onset headache, temporal tenderness and pulselessness, older age and an increased ESR. Jaw claudication and amaurosis fugax may also occur.

**(Choice 3)** Anorexia may be a sign of an underlying malignancy or bowel disorder.

**(Choice 4)** Ankle swelling may result from venous insufficiency, renal insufficiency, right heart failure or hepatic disease, but it is not a common finding in arterial occlusive disease.

142. Question

1 points

**Category: Surgery**

A 37-year-old woman comes to the physician's office because of left breast discomfort. The discomfort has been there for several months, and she recently started having breast pain before menses. Yesterday she noticed a lump in her breast. She has no family history of breast cancer. She smokes one pack of cigarettes every day. She had a baseline mammogram at age 35, which showed no abnormalities. Examination shows a smooth, soft, mobile mass palpable in the upper outer quadrant of the left breast; some diffuse nodularity is present bilaterally. Vital signs are normal. Physical examination otherwise shows no abnormalities. Fine needle aspiration of the mass shows thin greenish, nonbloody fluid; the mass disappears completely after the aspiration. Which of the following is the most appropriate next step in management?

1. ☐ Recommend mammogram to be done as soon as possible
2. ☐ Prescribe oral contraceptives and reassure her
3. ☐ Reassure and reexamine her in six weeks ☒
4. ☐ Send the aspirated fluid for cytologic analysis
5. ☐ Recommend ultrasound evaluation of the aspirated cyst

**INCORRECT** ☐

**The correct answer is 3.**

Fibrocystic condition of the breast is the most common cause of benign breast masses. It is most common in women 30 to 50 years of age. Presentation is classically with breast pain that worsens around the time of menses. The breast masses associated with fibrocystic disease often occur and resolve rapidly. On exam the cysts are tender and mobile. Because carcinoma cannot be completely ruled out, fine needle aspiration biopsy of a representative or dominant mass is indicated. Typically, the aspirate from such masses is serous and nonbloody, and typically the cysts disappear completely after aspiration. After aspiration, the mass should be observed for recurrence, and if the mass does recur a tissue biopsy is indicated.

**(Choices 1 & 5)** Mammogram would be indicated if the mass did not disappear completely or if its contents were bloody. If the normal breast tissue is dense, as in young women, a mass may not be seen on mammogram. In such cases, ultrasound would be indicated.

**(Choice 2)** Oral contraceptives may worsen the discomfort associated with fibrocystic change as estrogen is believed to be a causative factor. Additionally, this patient is a smoker over age 35 and thus use of OCPs increases the risk of thromboembolic disease.

**(Choice 4)** There is no need to send the nonbloody aspirate for cytologic evaluation as false negative results may cause an inappropriate sense of security.

### 143. Question

1 points

#### Category: Surgery

A 31-year-old man is brought by helicopter to the trauma center after a motor vehicle accident in which he sustained massive lower extremity crush injury. The patient is alert and awake but in tremendous pain. His blood pressure is 140/80 mm Hg, and his pulse is 110/min. There is copious ongoing blood loss from the sites of injury. Urgent laboratory data will most likely show which of the following electrolyte abnormalities?

1. ☐ Hyperkalemia ☐
2. ☐ Hyponatremia
3. ☐ Hypocalcemia
4. ☐ Hypoglycemia
5. ☐ Hypophosphatemia

**INCORRECT** ☐

**The correct answer is 1.**

Crush injury results in massive tissue damage. There are obvious organ-specific consequences of such injury, but it is the musculo-skeletal system that is the focus of this question. Massive necrosis and lysis of muscle releases intracellular myoplasm components that are toxic in high concentrations. Examples of such constituents include potassium, creatine kinase, and protein. It can be generally assumed that any patient with significant crush injuries will have autolysis of hundreds of milli equivalents of potassium into the blood.

**(Choice 2)** There is no significant derangement in sodium levels, such as hyponatremia, after a crush injury.

**(Choice 3)** Cells in general and myocytes in particular, are storehouses of calcium. With significant myonecrosis, serum calcium can rise to dangerous levels, producing hypercalcemia, rather than hypocalcemia.

**(Choice 4)** would not be seen in this patient. Because of the stress of his injuries and the elevated levels of cortisol and epinephrine in his blood, massive amounts of glucose would be mobilized. Thus, if any derangement in glucose homeostasis were present, it would likely be hyperglycemia.

**(Choice 5)** Hyperphosphatemia, rather than hypophosphatemia, is observed with a crush injury. Phosphate is an intracellular buffer that is also released from cells after necrosis and lysis.

144. Question

1 points

Category: Surgery

A 22-year-old woman is brought to the emergency department after a motor cycle accident in which she sustained severe crush injuries of her lower extremities. In the field, her Glasgow Coma Score was 14. She is awake and alert on arrival after having been given morphine for pain control. Any details of her past medical history are unknown. Initial examination shows a blood pressure of 140/80mm Hg and pulse of 100/min. Her oxygen saturation on room air is 95% by pulse oximeter. An ECG is obtained and shows very large, peaked T-waves in leads VL to V6. Which of the following is the most appropriate initial step in patient care?

1. ☐ Administer oral sodium polystyrene sulfonate (Kayexalate)
2. ☐ Administer IV calcium gluconate ☐
3. ☐ Administer IV bicarbonate
4. ☐ Administer IV insulin and dextrose
5. ☐ Initiate urgent hemodialysis

**INCORRECT** ☐

**The correct answer is 2.**

Crush injuries produce massive necrosis, and lysis of muscle releases potassium, creatine kinase, and protein in large amounts. All the listed choices are options for managing the resultant hyperkalemia, but only administration of calcium is absolutely mandatory in the presence of hyperkalemia accompanied by ECG changes. Calcium acts as a membrane-stabilizing agent to balance against the imminent hyperkalemia-induced global depolarization of the myocardium.

**(Choice 1)** is an effective way of permanently removing potassium from the body over a period of 4-10 hours. Its action is not acute, and it has no value in acute situations.

**(Choice 3)** is also only a temporizing measure that acts in a similar manner to insulin by causing a transcellular shift of potassium from extracellular to intracellular spaces.

**(Choice 4)** is a temporizing measure that acts to force a transcellular shift of potassium from outside to in. This will afford only brief protection against rapidly rising serum potassium. **(Choice 5)** is indicated only if the medical management of the hyperkalemia fails.

145. Question

1 points

**Category: Surgery**

A 34-year-old man is brought to the emergency department after being involved in a motorbike accident. Examination shows a hematoma on the forehead and bleeding from his leg. His pupils are bilateral round and reactive; he has papilledema. He responds to pain, has decorticate posture and speaks incoherently. After the initial resuscitation you start the treatment with intravenous fluids, hyperventilation, head elevation and intravenous mannitol. Which of the following is the mechanism of action of hyperventilation in this patient?

1. ☐ Hyperventilation acts as stimuli to brain and helps to arouse the patient
2. ☐ Hyperventilation corrects hypoxia
3. ☐ Hyperventilation helps to wash out the carbon dioxide
4. ☐ Hyperventilation causes vasoconstriction and helps to reduce his bleeding
5. ☐ Hyperventilation causes vasoconstriction and thus decreases the cerebral blood flow



**INCORRECT** ☐

**The correct answer is 5.**

This patient has head injury with Glasgow coma score of 7 (verbal score of 2, eye score of 2 and motor score of 3). He also has papilledema, which is suggestive of increased ICP (intracranial pressure). Patients with increased ICP should be treated with hyperventilation, head elevation, and intravenous mannitol and diuretics. Hyperventilation works by causing vasoconstriction and decreasing the intracranial pressure by decreasing the cerebral blood volume. It can also be used to prevent the increased ICP in at risk patients. When ICP is definitely elevated, hyperventilation is used to have pCO<sub>2</sub> in the range of 30-35 mm Hg. Values lower than this are considered extreme hyperventilation and run a risk of marked iatrogenic brain ischemia.

**(Choice 1)** Hyperventilation has no role as a brain stimulant in head trauma patients.

**(Choices B and C)** The purpose of hyperventilation is not to correct hypoxia or wash out CO<sub>2</sub> in head injury patient, but to decrease the intracranial pressure by decreasing the cerebral blood flow. The best way to prevent hypoxia and wash out CO<sub>2</sub> in head injury patient is to intubate and mechanically ventilate the patient.

**(Choice 4)** Brain and not peripheral capillaries are highly sensitive to  $p\text{CO}_2$  and so hyperventilation cannot be used as a mean to decrease peripheral bleeding.

146. Question

1 points

**Category: Surgery**

A 15-year-old female presents to the emergency department with a 2-day history of lower abdominal pain. The patient states that the pain began in the right lower quadrant, but has progressively worsened over the last 24 hours, becoming quite intense. She denies having a fever but complains of nausea, vomiting, and a poor appetite. Her last menstrual period was 6 weeks ago, and she reports being sexually active only twice. Currently she takes no medications and denies allergies. On physical exam, she appears acutely ill and has diffuse tenderness in the lower abdomen, with the right side being worse than the left, with no peritoneal signs. Rectal and pelvic exams are normal. A serum  $\beta$ -hCG level is 5500 mIU/mL. What is the most likely diagnosis?

1. ☐ Acute appendicitis
2. ☐ Acute diverticulitis
3. ☐ Ruptured ovarian cyst
4. ☐ Tubo-ovarian abscess
5. ☐ Ectopic pregnancy ☐

**INCORRECT** ☐

**The correct answer is 5.**

Ectopic pregnancy should be high on the differential diagnosis of a woman of reproductive age with abdominal pain. Its incidence has increased over the past few years secondary to an increase in the incidence of pelvic inflammatory disease (PID). An ectopic pregnancy usually occurs after implantation of the embryo in the fallopian tube; this tube is not suited to accommodating the conceptus. The growing conceptus will eventually erode into blood vessels or cause the fallopian tube to rupture. Delay in diagnosis can lead to catastrophic bleeding and maternal death. Patients usually present with abdominal pain, amenorrhea, and vaginal bleeding. The diagnosis is made by obtaining a  $\beta$ -hCG level and a pelvic ultrasound. Traditional treatment has consisted of surgical removal, although some ectopic gestations may be treated with methotrexate.

**(Choice 1)** Acute appendicitis should always be on the differential diagnosis list at this point. The clinical presentation in this case and the positive pregnancy test warrant investigation of an ectopic pregnancy, however. Pelvic ultrasound usually reveals a noncompressible, fluid-filled tubular structure in the right lower quadrant with a diameter greater than 6 mm.

**(Choice 2)** Acute diverticulitis is more common in older patients. It would be extremely unlikely in such a young female.

**(Choice 3)** A ruptured ovarian cyst should be high on the differential diagnosis list in a woman of reproductive age. A CT scan can be helpful for distinguishing the etiology of the pain. A ruptured cyst would most likely demonstrate free pelvic fluid without an adnexal mass.

**(Choice 4)** Tubo-ovarian abscesses develop in approximately 15% of women with PID and can often mimic appendicitis. Risk factors for developing PID include multiple sexual partners, previous PID, and use of an intrauterine device for birth control. Treatment of an abscess would include surgical drainage and IV antibiotics. Complications of infertility may occur from severe scarring caused by PID, and affected women have an increased risk for ectopic pregnancy.

147. Question

1 points

**Category: Surgery**

A 35-year-old man had a splenectomy 8 days ago, following a motor vehicle accident. He is now complaining of left shoulder pain. His temperature is 39.0 C (102.2 F), blood pressure is 110/80 mm Hg, pulse is 110/min, and respirations are 30 min and shallow. Physical examination shows clear lungs with equal breath sounds bilaterally and mild tenderness to palpation in the left upper quadrant with a well-healing midline laparotomy incision. Laboratory studies show:

Hemoglobin: 15 g/dL

Hematocrit: 45%

Leukocyte counts: 15,000/mm<sup>3</sup>

A chest x-ray film shows no infiltrates or effusions. Which of the following is the most likely diagnosis?

1. ☐ Left clavicle fracture
2. ☐ Left lower lobe pneumonia
3. ☐ Post-splenectomy sepsis
4. ☐ Subphrenic abscess ☒
5. ☐ Subphrenic hematoma

**INCORRECT** ☐

**The correct answer is 4.**

Subphrenic abscess is a common complication of splenectomy and is implied by the patient's elevated temperature and elevated WBC, pleuritic pain (which is the probable cause

of his rapid and shallow respirations), and left upper quadrant tenderness. A subphrenic abscess would irritate the phrenic nerve (nerve root C3-CS), causing referred pain toward dermatome of the nerve root, which includes the left shoulder.

**(Choice 1)** appear erythematous at the site of fracture and exhibit crepitus on palpation. The arm is usually held close to the body, and the ipsilateral shoulder appears lower than the opposite side.

**(Choice 2)** One would expect rales or rhonchi instead of clear lungs and equal breath sounds in a patient with left lower lobe pneumonia.

**(Choice 3)** would not produce such localized symptoms.

**(Choice 5)** is not consistent with the fever and leukocytosis observed in this patient.

## 148. Question

1 points

### Category: Surgery

A 62-year-old, right-handed man has a sudden onset of neurologic deficits. While he was watching the news on television, he suddenly could not move his right upper extremity or speak. His family promptly transported him to the nearest emergency room, where he arrived about 20 minutes after the onset of symptoms. He is found to be normotensive, awake, and alert but unable to move his right arm or articulate his speech. He can understand what is said to him but can only respond by nodding his head or motioning his left arm. He denies the presence of any headache when his symptoms developed. He is rapidly moved to the CT scan machine, and a CT scan of his head is completed within the next 20 minutes. The scan shows a small area of cortical ischemia on the left side, affecting the motor strip and the speech center. There are no radiologic signs of intracranial bleeding. By the time he returns from the scanner, approximately 50 minutes have elapsed since his symptoms began. His neurologic deficits have not changed. Which of the following should be the next step in management?

1. ☐ Continued clinical observation for 3 hours
2. ☐ Duplex scanning of his carotid arteries
3. ☐ Emergency left carotid endarterectomy
4. ☐ Intravenous heparin and loading dose of oral coumadin
5. ☒ Intravenous infusion of tissue-type plasminogen activator ☐

**INCORRECT** ☐

**The correct answer is 5.**

When this man first arrived at the emergency room, he might have been suffering from a transient ischemic attack, from which he might have spontaneously recovered. But in the time taken to do a quick neurologic evaluation and scan of the patient's head, there has been



no resolution of his neurologic deficits. He may, in fact, be having the onset of an ischemic stroke. The scan shows no bleeding and no extensive infarction, making him an ideal candidate for “dot busters,” These are best when used within the first 90 minutes of symptoms, and, in this case, that window of opportunity is about to run out. Infusion of tissue type plasminogen activator should be started.

**(Choice 1)** The absolute time constraint for using dot busters for ongoing ischemic stroke is 3 hours, and the results are slightly better if the treatment is started within the first 90 minutes. Continued clinical observation for 3 additional hours would waste that time window and preclude their use. It is true that the patient might spontaneously recover neurologic function during that time, proving that he had a transient ischemic attack instead of a stroke, but gambling on that outcome would be irresponsible.

**(Choices 2 & 3)** Duplex scanning of the carotids and subsequent carotid endarterectomy are used in patients who have had transient ischemic attacks, have recovered neurologic function, and have to be protected from a future stroke. Once this man has been effectively treated for his current problem, he will need the carotid study and probably an endarterectomy. However, these steps would not correct the current situation, if he is indeed having a stroke.

**(Choice 4)** Anticoagulants are not the same as clot busters. Heparin and coumadin would not affect the existing clot that is blocking the patient’s cerebrovascular circulation. Tissue-type plasminogen activator, on the other hand, will dissolve the existing clot.

#### 149. Question

1 points

##### Category: Surgery

A 54-year-old woman has had a forceful hyperextension injury to her hand. She complains of pain and swelling of the right wrist. Examination shows maximal tenderness in the anatomical snuff box and pain with radial deviation of the wrist. She has no other injuries or complaints. X-ray imaging of the wrist in multiple views did not reveal a fracture. Which of the following is the most appropriate next step in management?

1. ☐ Analgesics and rest
2. ☐ Recommend ultrasonogram of the wrist
3. ☐ Place a thumb spica cast and repeats radiographs in 2-3 weeks ☐
4. ☐ Recommend DEXA scan to screen for osteoporosis
5. ☐ Recommend steroid injection

INCORRECT ☐

**The correct answer is 3.**

The scaphoid is the most commonly fractured bone in the wrist. Patients classically fracture their scaphoid during a fall on an outstretched hand with the wrist extended resulting in forced hyperextension of the wrist. Physical examination will show tenderness in the anatomic snuffbox. Patients with these findings should be suspected to have a scaphoid fracture and radiographs should be obtained from four different positions. If radiographs are negative for a fracture but a fracture is clinically suspected, a nondisplaced scaphoid fracture should be presumed and the patient should be treated accordingly with a thumb spica cast and repeat radiographs in 2-3 weeks. Scaphoid fractures are particularly concerning because the tenuous blood supply to the scaphoid makes the proximal fracture fragment vulnerable to avascular necrosis.

**(Choice 1)** Analgesics and rest in addition to a wrist splint would be appropriate for a soft tissue injury such as a wrist sprain.

**(Choice 2)** While ultrasonogram may be used to assess various pathologies of the wrist, the study that may conclusively prove wrist fracture in the presence of negative wrist x-rays is a bone scan.

**(Choice 4)** While a 54-year-old woman may have osteoporosis, and osteoporosis may possibly predispose her to fractures, this is not the most appropriate treatment.

150. Question

1 points

**Category: Surgery**

A 65-year-old man makes an emergency appointment to see his family physician because of sudden loss of vision in the right eye. In presenting a history, the patient states that he first noticed it when he closed his left eye while taking aim at target practice. He further reveals that he has no pain, and other than a history of coronary artery disease, which causes angina, he has no other medical problems. His only medication is nitroglycerin sublingual tablets on an as-needed basis. Physical examination reveals a patient who is not in pain and has normal vital signs. His eyelids are normal. There is no conjunctival or circumcorneal injection. In the affected eye, the anterior chamber appears normal. The pupil is moderately dilated and fails to react to direct light, but responds to consensual light reflex. Funduscopy reveals pallor of the optic disc, a cherry-red fovea, and bloodless arterioles. These findings are most consistent with which one of the following choices?

1. ☐ Central retinal vein occlusion
2. ☐ Acute angle-closure glaucoma
3. ☐ Corneal abrasion
4. ☒ Central retinal artery occlusion ☐
5. ☐ Optic neuritis

**INCORRECT** ☐**The correct answer is 4.**

The patient has central retinal artery occlusion. Retinal artery occlusion could be central or peripheral. The disorder is characterized by a sudden, complete, painless loss of vision in one eye. The patient often notices it when he or she closes one eye. Potential causes include atherosclerotic carotid disease, giant cell arteritis, lipid emboli from trauma, intravenous drug abuse, sickle cell anemia, and hypercoagulable states. Funduscopy reveals pallor of the optic disc, edema of the retina, and a cherry-red spot. The cherry-red spot represents ischemia and edema of the posterior retina, and occurs within hours following the occlusion. The red color is due to perfusion of the choroid through the thinner retinal tissue. Segmentation of retinal vessels giving a boxcar appearance is a feature as well. Initial management is massaging the eyeball. Thereafter, the patient is asked to breathe into a paper bag to increase PCO<sub>2</sub>. Doing so will induce vasodilatation of the artery and (one hopes) dislodge the embolus. Definitive treatment involves anterior chamber paracentesis under slit lamp examination. It is the best method to lower intraocular pressure and dislodge the embolus.

**(Choice 1)** is characterized by a sudden, painful, unilateral loss of vision in patients with hypercoagulable states and thrombotic disorders such as deep venous thrombosis.

**(Choice 2)** also is usually unilateral, but clinical features include intense ocular pain associated with nausea and vomiting and diminished vision with colored halos around lights. The pupil is mid-dilated and fixed, and perilimbal injection may be present. The anterior chamber is shallow, and this can be confirmed by gonioscopy. Failure to diagnose this condition and treat it in a timely manner will lead to blindness. Treatment involves decreasing intraocular pressure with  $\beta$ -blockers such as timolol, and carbonic anhydrase inhibitors as adjuncts. Miotics such as pilocarpine or cholinesterase inhibitors are also used.

**(Choice 3)** is associated with pain and lacrimation (epiphora) and blepharospasm. Diagnosis is made by fluorescein staining of the cornea and observing it under a slit lamp. Treatment involves removal of the foreign body if present, and topical antibiotics.

**(Choice 5)** presents with unilateral central visual loss associated with painful eye movements. It is usually seen in patients with demyelinating disease such as multiple sclerosis. Most patients recover spontaneously over time. Funduscopy reveals a normal disc in most patients. Some patient may have edema.

**(Choice 6)** is most commonly seen in systemic hypertension. Funduscopy reveals a "blood and thunder" fundus, i.e.: dilated tortuous veins, flame-shaped hemorrhages, macular edema, cotton wool spots, and exudates. Neovascularization of the retina or iris can occur and result in secondary glaucoma. Treatment is laser photocoagulation.

## Category: Surgery

A 46-year-old man is brought to the emergency department after being involved in a motor vehicle collision. He is unresponsive. His injuries include a basilar skull fracture, brain contusion, fractures of ribs 7-10, hemopneumothorax on the right and a pelvic fracture. After placement of a chest tube and pelvis fixation, his condition stabilized. On the fifth day of his hospital stay, he is still unresponsive with a Glasgow Coma Scale of 8. He is breathing spontaneously. Examination shows an abnormal facial reaction to abdominal palpation. Pain appears to be elicited by palpation in right upper quadrant. Bowel sounds are diminished. Rectal examination shows no abnormalities. Nasogastric tube aspiration shows retention of gastric contents. An abdominal CT scan shows gaseous distention of the small and large bowels without air fluid levels. The gall bladder is distended and pericholecystic fluid is present. Stones are not seen. Which of the following is the most likely diagnosis?

1. ☐ Bowel obstruction
2. ☐ Cholecystitis ☒
3. ☐ Pancreatitis
4. ☐ Mesenteric contusion
5. ☐ Lung contusion

**INCORRECT** ☒

**The correct answer is 2.**

The patient described is most likely suffering from acalculous cholecystitis. This condition is most often seen in patients chronically hospitalized in the intensive care unit with any of the following conditions: multiorgan failure, severe trauma, surgery, burns, sepsis or prolonged parenteral nutrition. The pathogenesis of this condition is unclear, but it is most likely the result of cholestasis and gall bladder ischemia leading to secondary infection by enteric organisms, edema of the gall bladder serosa and necrosis of the gall bladder. Most patients affected by this condition have no prior history of gall bladder disease. Acalculous cholecystitis is a serious condition that can lead to sepsis and death if undetected. The clinical signs of disease, such as fever and leukocytosis, are vague, and patients most vulnerable to this condition are typically non-communicative due to their general medical condition. The best way to make the diagnosis is to have a high degree of clinical suspicion and to confirm the diagnosis with imaging studies that demonstrate gallbladder distention, thickening of the gall bladder wall and the presence of pericholecystic fluid. The immediate treatment is cholecystostomy, which may be followed by cholecystectomy when the patient's medical condition improves.

**(Choice 1)** Mechanical bowel obstruction typically is associated with high-pitched hyperactive bowel sounds and dilated loops of bowel with air-fluid levels on abdominal imaging. The bowel distention in this patient is due to paralytic ileus, which is not uncommon after major trauma.

**(Choice 3)** Pancreatitis would not cause a distended gall bladder and pericholecystic fluid. CT findings consistent with pancreatitis would be pancreatic phlegmon, pseudocyst or abscess formation or pancreatic necrosis.

**(Choice 4)** Mesenteric contusion may be the cause of the patient's paralytic ileus, but it does not explain the gall bladder findings on imaging.

**(Choice 5)** This patient most likely did suffer a pulmonary contusion in his initial traumatic insult. Pulmonary contusion frequently occurs when multiple ribs are fractured, and such an injury may have contributed to his hemothorax. A pulmonary contusion would not cause the gall bladder findings on imaging.

## 152. Question

1 points

### Category: Surgery

A 48-year-old obese woman was admitted to the hospital with upper-right-quadrant pain and vomiting. She had no diarrhea or constipation. Clinical examination revealed tenderness in the right upper quadrant, and appropriate investigations demonstrated the presence of a stone in the common bile duct. Attempts to dislodge the stone endoscopically proved futile, so she underwent common bile duct exploration. Six days after surgery, she developed a temperature of 38°C (101°F). Which of the following is the most likely cause of her fever?

1. ☐ Resorption of blood from the peritoneum
2. ☐ Endotoxic shock
3. ☐ Atelectasis
4. ☐ A wound infection ☐
5. ☐ Renal failure

**INCORRECT** ☐

**The correct answer is 4.**

The patient most likely has a postoperative wound infection, which occurs in 2%–5% of patients who have had biliary tract Surgery. The infections are usually the result of contamination of the wound either during or after Surgery; there rarely is an infection prior to Surgery. Although infections can become evident within 1 day in a grossly contaminated wound, they generally first emerge 5–10 days postoperatively. Operative wounds are classified as clean (no gross contamination), clean-contaminated (e.g., in gastric or biliary tract Surgery), contaminated (e.g., in unprepared colon Surgery), or dirty and infected (infection encountered during the Surgery). The risk for wound infection increases if the wound is located in the abdomen, the Surgery lasts longer than 2 hours, or contamination of the wound is encountered during Surgery. One of the key factors that predisposes to

infection is decreased oxygen tension in the tissues. Attention to careful surgical techniques (reduced trauma to tissue, less suture material, removal of foreign bodies) and prophylactic use of antibiotics in certain types of surgeries reduce the chance of infection. Cefazolin is the drug of choice for prophylaxis during Surgery when both aerobes and anaerobes are a concern. Antibiotic prophylaxis is only given in selected clean or clean-contaminated procedures because antibiotic use in contaminated and dirty wounds is considered therapeutic. A single preoperative dose should be administered intravenously at the time of induction of anesthesia. Additional doses may be given after Surgery but are usually discontinued within 24 hours. Treatment of wound infection involves opening the wound and allowing drainage. Antibiotics are reserved for invasive infections.

**(Choice 1)** is not associated with fever.

**(Choice 2)** would be accompanied by warm shock, due to vasodilation of peripheral vessels, and would be an unlikely cause of this woman's fever.

**(Choice 3)** is the most common cause of fever within 24 hours of Surgery.

**(Choice 5)** is associated with oliguria, not fever.

### 153. Question

1 points

#### Category: Surgery

A 35-year-old woman has dyspnea on exertion, orthopnea, paroxysmal nocturnal dyspnea, cough, and hemoptysis. The symptoms have been slowly progressive for about 5 years. She looks thin and cachectic, and has atrial fibrillation and a low-pitched, rumbling diastolic apical heart murmur. At age 15, she had rheumatic fever. Surgery has been recommended: Which of the following is the most appropriate management?

1. ☐ Closure of the ventricular septal defect
2. ☐ Mitral annuloplasty to tighten an incompetent mitral valve
3. ☐ Mitral commissurotomy to open a stenotic mitral valve ☐
4. ☐ Prosthetic replacement of the aortic valve
5. ☐ Prosthetic replacement of the mitral valve

**INCORRECT** ☐

**The correct answer is 3.**

The clinical picture is that of mitral stenosis, with the apical diastolic murmur plus all the typical symptoms for that condition. As a rule, cardiovascular surgeons prefer to repair the patient's own mitral valve, rather than replacing it. Stenosis is due to fusion at the commissures, which commissurotomy can correct.



**(Choice 1)** A ventricular septal defect would produce a systolic murmur and, if uncorrected by age 35, would have produced pulmonary vascular damage, with a potential reversal of the shunt and even cyanosis.

**(Choice 2)** Although mitral annuloplasty targets the correct valve, it assumes that the problem is insufficiency rather than stenosis. Had that been the case, the apical murmur would have been systolic, rather than diastolic.

**(Choice 4)** Replacement of the aortic valve would be correct if the patient had a deformed aortic valve, as these cannot be easily repaired. In this case, however, the sick valve is the mitral (with an apical murmur) rather than the aortic, who would have produced a murmur best heard at the base.

**(Choice 5)** Replacement of the mitral valve can be done, and is indeed done, but not as the first choice if repair is possible.

#### 154. Question

1 points

##### Category: Surgery

A 16-year-old boy is persuaded by his older brother to accompany him and his friends on a beer-drinking binge. This is the first such experience for the boy, and it leads to the development of severe colicky left flank pain. When rescued by his parents, he is diaphoretic and doubled up in pain. He relates that he began to urinate frequently and profusely after the third or fourth beer and that the pain seized him shortly thereafter. He is tender to fist percussion over the left costovertebral angle but is afebrile. Which of the following is the most likely diagnosis?

1. ☐ Bladder calculi
2. ☐ Low implantation of one ureter
3. ☐ Ureteral stone
4. ☒ Ureteropelvic junction obstruction ☐
5. ☐ Vesicoureteral reflux

**INCORRECT** ☐

**The correct answer is 4.**

The correlation between ureteropelvic junction obstruction and profuse diuresis is classic. A congenital narrowing at the ureteropelvic junction allows normal passage of urine at a normal flow rate, but the lumen cannot accommodate a suddenly increased flow rate. Beer is a wonderful diuretic; if he had never been exposed to it, his congenital anomaly could have remained hidden.

**(Choice 1)** would give suprapubic pain and symptoms of an irritative bladder.

**(Choice 2)** is typically asymptomatic in the male but could lead to incontinence in the female.



**(Choice 3)** is a good second choice, and it could cause flank pain radiating to the inner thigh and scrotum. However, the youngster who develops colicky flank pain when first exposed to beer is so classic for ureteropelvic junction obstruction that urologists can make the correct diagnosis over the telephone.

**(Choice 5)** gives a febrile picture along with flank pain. It is typically seen in younger children, who eventually outgrow their problem.

155. Question

1 points

**Category: Surgery**

A 53-year-old woman sustains multiple injuries in a head-on automobile collision. She was driving the car and wearing a seat belt. At the moment of impact, she was held in place by the belt, but she hit the windshield with her face, the dashboard with her arms, and the steering wheel with her abdomen. Initial survey reveals closed fractures in both upper extremities, facial lacerations, and abdominal bruises. She is breathing well and is neurologically intact, but she is complaining of severe abdominal pain. Her blood pressure is 75/55 mm Hg, pulse is 110/min, and central venous pressure is zero. Physical examination of the abdomen shows tenderness, guarding, and rebound tenderness on all quadrants. There is no evidence of pelvic fracture. Which of the following would be the most appropriate study to evaluate her abdominal injuries?

1. ☐ Sonogram of the abdomen
2. ☐ Flat and upright x-ray films of the abdomen
3. ☐ CT scan of the abdomen
4. ☐ Diagnostic peritoneal lavage
5. ☐ Exploratory laparotomy ☐

**INCORRECT** ☐

**The correct answer is 5.**

Indications for exploratory laparotomy in trauma patients include those with intra-abdominal bleeding that has been demonstrated by appropriate tests, but also those with an acute abdomen (severe pain, tenderness, guarding, and rebound tenderness) following abdominal trauma. This woman is probably bleeding into her abdomen (she has no other obvious source). Even if that were not the case, however, she needs an exploratory laparotomy to deal with the source of the acute abdomen, which is bound to be injuries of hollow viscera.

**(Choice 1)** Sonogram is used extensively to diagnose intra-abdominal bleeding, but it does not tell us what to do, or not to do, for the acute abdomen.

**(Choice 2)** X-ray films would add little to our decision. Free air under the diaphragm would prove visceral disruption, but the absence of such a finding would not exclude it.

**(Choice 3)** CT scan is excellent in the hemodynamically stable patient in whom the only question is intraabdominal bleeding. In this case, we are also contending with the acute abdomen. Furthermore, with a systolic blood pressure of 75 mm Hg, this woman cannot afford a trip to the CT scanner.

**(Choice 4)** Diagnostic peritoneal lavage is excellent to prove intra-abdominal injury, and is also extensively used to diagnose peritoneal contamination from ruptured hollow viscera. However, the latter is required only when the abdomen cannot be examined reliably (e.g., the drunk or the unconscious patient). This woman is telling us that her belly hurts, and our physical exam is diagnostic.

156. Question

1 points

**Category: Surgery**

A 29-year-old man presents to the ER with persistent vomiting and abdominal pain for the last 24 hours. The pain is crampy, diffuse, and has been getting worse. He had a normal bowel movement two days ago and denies diarrhea. The emesis appears green without blood or coffee grounds. He has not eaten since the onset of the pain due to nausea. On exam, his temperature is 36.5 °C (98.2 °F), pulse is 91/min, and blood pressure is 116/75 mmHg while sitting and 94/65 mmHg while standing. His abdomen is distended with hyperactive bowel sounds. Percussion reveals tympany and he is diffusely tender to palpation. There is no rebound tenderness or guarding. Laboratory studies reveal:

**WBC count:** 9.6/mm<sup>3</sup>

**Hematocrit:** 45%

**Sodium:** 147 mEq/L

**Potassium:** 3.1 mEq/L

**Creatinine:** 1.0 mg/dL

**AST:** 20 U/L

**ALT:** 12 U/L

**Bilirubin:** 0.8 mg/dL

Which of the following historical findings would you most expect in this patient?

1. ☐ High alcohol consumption
2. ☐ Occasional black or tarry stool
3. ☐ Appendectomy six months ago ☐
4. ☐ Fatty food intolerance
5. ☐ Recent weight loss

**INCORRECT** ☐

**The correct answer is 3.**

This patient has a mechanical small bowel obstruction (SBO). This disorder may be further categorized by anatomic location (i.e., proximal versus mid/distal) or simple versus strangulated. Complete proximal obstructions are characterized by vomiting, abdominal discomfort, and abnormal contrast filling on x-ray. Mid or distal obstructions typically present as colicky abdominal pain, vomiting, abdominal distention, constipation obstipation, and dilated loops of bowel on abdominal x-ray. Simple obstruction refers to luminal occlusion, whereas strangulation refers to a loss of blood supply to the bowel wall. Patients with strangulated obstructions may present with a rigid abdomen and signs of shock. Fever, tachycardia, and elevated WBC count are late findings. The patient in this vignette most likely has a simple mid or distal SBO. Adhesions are by far the most common cause of SBO. They may be congenital in children (e.g., Ladd's bands), but typically result from abdominal operations or inflammatory processes. Thus, this adult patient with an SBO is likely to have had an abdominal surgery in the past, such as an appendectomy.

**(Choice 1)** High alcohol consumption can be associated with acute pancreatitis or alcoholic hepatitis. Pancreatitis can cause an ileus and a tympanic abdominal exam. However, an AST/ALT ratio of more than 2 is typically observed if the patient is a heavy alcohol drinker. In addition, abdominal pain in pancreatitis is usually epigastric, constant, and radiates to the back.

**(Choice 2)** Occasional black or tarry stools (i.e., melena) are suggestive of a GI bleed originating above the ligament of Treitz. The most common causes of melena in a man this age are peptic ulcer disease (PUD), gastritis, esophagitis, and Mallory-Weiss tear. PUD is a rare cause of proximal but not mid-distal SBO. The other etiologies are not associated with bowel obstruction.

**(Choice 4)** Ingestion of fatty foods precipitates biliary colic and acute cholecystitis, which usually cause right upper quadrant abdominal pain. Acute cholecystitis is accompanied by fever, leukocytosis, and sometimes abnormal liver function tests.

**(Choice 5)** Recent weight loss can be a sign of neoplasm, an endocrine disorder, or an inflammatory condition. Neoplasms and inflammatory conditions can cause SBO but are much less common causes than post-operative adhesions, especially in a younger patient.

157. Question

1 points

**Category: Surgery**

A 31-year-old biker is involved in a motor vehicle accident after attending a party where he drank a lot of soda drinks. He describes a direct blow to his lower abdomen and pelvis during the accident. He complains of diffuse abdominal pain that refers to his left shoulder. Which of the following injuries most likely accounts for this patient's current symptoms?

1. ☐ Bladder neck

- 2. ☐ Bladder dome ☐
- 3. ☐ Anterior bladder wall
- 4. ☐ Pseudomembranous urethra
- 5. ☐ Anterior urethra

**INCORRECT** ☐

**The correct answer is 2.**

Abdominal pain that refers to the shoulder suggests an intraabdominal pathology that is causing peritonitis and irritation of the diaphragm (Kehr sign). Pain sensation resulting from irritation of the parietal peritoneum covering the undersurface of either hemidiaphragm can be referred to the ipsilateral shoulder because the phrenic nerve originates from the C3 through C5 spinal levels, which also mediate sensation for the shoulder region. In the setting of blunt abdominal trauma, hemoperitoneum or spillage of bowel contents, bile, pancreatic secretions or urine can cause an acute chemical peritonitis. The choices given indicate that a bladder or urethral injury is the cause of this patient's symptoms. Intraperitoneal rupture of the bladder occurs in blunt trauma to a full, distended bladder. The dome of the bladder is the only region covered by peritoneum; thus, it is the only injury that would permit leakage of urine into the peritoneum. Additionally, the dome of the bladder has a developmental hiatus where the urachus originates during embryonic life. Since the dome is attenuated in this region, it is also the segment of the bladder wall which is most susceptible to rupture caused by sudden increases in intravesical pressure.

**(Choices 1,3,4 & 5)** The other lower urinary tract structures listed in the answer choices are all extraperitoneal. Any possible blunt traumatic injury to each of these structures would not, by itself, cause peritonitis. Injury to any of these structures is classically associated with severe trauma and pelvic fracture. The most common site of extraperitoneal bladder rupture is the bladder neck.

158. Question

1 points

**Category: Surgery**

A 21-year-old male college student presents to the outpatient clinic for a routine examination at the beginning of the fall semester. He has a history of irritable bowel syndrome. Physical examination of the heart, lungs, and abdomen are unremarkable. Genitourinary examination reveals that the testes are descended bilaterally. A left grade 1 varicocele is present. There are no testicular masses. The penis is uncircumcised, and the foreskin is unable to be retracted behind the glans. What is the most likely diagnosis?

- 1. ☐ Balanitis

2. ☐ Hypospadias
3. ☐ Epispadias
4. ☐ Paraphimosis
5. ☐ Phimosis ☒

**INCORRECT** ☒

**The correct answer is 5.**

Phimosis is an acquired or congenital condition in which the foreskin cannot be pulled back behind the glans penis. In acquired phimosis, there likely is a history of poor hygiene, chronic balanoposthitis, or forceful retraction of a congenital phimosis. Balanitis is inflammation of the glans of the penis. Hypospadias is an anomaly in which the urethral meatus opens on the ventral surface of the penis. Epispadias is an anomaly in which the urethral meatus opens on the dorsal surface of the penis. Paraphimosis is an emergency condition in which the foreskin, once pulled back behind the glans penis, cannot be brought down to its original position.

159. Question

1 points

**Category: Surgery**

A 65-year-old man reports episodes of gross, total, painless hematuria that have been on and off for about the past 2 months. He also has vague, mild, irritative voiding symptoms, but he reports no fever or outright pain on urination. He is obese, has a sedentary lifestyle, drinks alcohol in moderation, and has been smoking two packs of cigarettes per day since age 18. He denies a history of trauma to his abdomen or flanks, and other than moderate emphysema and his current complaint, he considers himself to be in good general health. The physical examination is noncontributory. Rectal examination shows a large, soft, boggy prostate with no nodules, and his prostate-specific antigen is normal for his age. Urinalysis reveals packed red cells, a few white cells, and no casts. An intravenous pyelogram is obtained, and the study is reported as normal. Which of the following should be the next step in management?

1. ☐ CT scan of both kidneys
2. ☐ Cystoscopy ☒
3. ☐ Prescribe levofloxacin
4. ☐ Prostatic biopsy
5. ☐ Retrograde cystogram

**INCORRECT** ☐

**The correct answer is 2.**

The relationship between smoking and bladder cancer is even more significant than the well-known relationship between smoking and lung cancer. This man is a prime candidate for bladder cancer. His workup has been appropriate until now because the intravenous pyelogram (IVP) is often the first test done in patients with hematuria. This study diagnoses renal cell carcinomas and ureteral tumors, but it is notoriously inaccurate for early bladder cancers. Thus, the patient's workup has not been completed, and he now needs a cystoscopy.

**(Choice 1)** is also an excellent study for diagnosing renal cell carcinoma, but this diagnosis has already been excluded with the IVP, and the CT scan is not the best test to find early bladder cancers.

**(Choice 3)** We are not ready to prescribe medications. Valuable time will be wasted if we assume that the patient has a urinary tract infection or prostatitis (for which we have no convincing findings) and we go for a trial of therapy. The patient will not respond to it, and, eventually, we will have to look into his bladder. A 65- year-old man with hematuria, a normal IVP, and a very strong history of smoking needs an immediate cystoscopy.

**(Choice 4)** Hematuria is not the typical presentation for prostatic cancer. Prostatic cancer is found by discovering a hard nodule on rectal exam, or by being alerted by a high PSA, neither of which is present here. Thus, there is nothing to biopsy in that organ.

**(Choice 5)** is used to rule out bladder injuries in trauma patients. It is not the best test for early bladder cancer. In fact, we have already injected radio opaque dye in this patient's bladder (as part of the IVP), and it failed to outline the tumor.

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## 160. Question

**1 points**

### Category: Surgery

A 36-year-old man is brought to the emergency department after being involved in a motor vehicle collision. He is in obvious distress. His blood pressure is 80/30 mm Hg, pulse is 140/min and respirations are 23/min. Examination reveals collapsed neck veins. Breath sounds are present bilaterally, heart sounds are normal and the trachea is midline. He is semiconscious and his pupils are bilaterally reactive. There is no obvious head injury. Abdominal examination shows distention with tenderness in all four quadrants with guarding and rigidity. After initial resuscitation including control of his airway, breathing and circulation, which of the following is the most appropriate next step in management?

1. ☐ Diagnostic laparoscopy
2. ☐ Chest x-ray
3. ☐ CT of the abdomen



- 4. ☐ Exploratory laparotomy ☐
- 5. ☐ Diagnostic peritoneal lavage

**INCORRECT** ☐

**The correct answer is 4.**

An emergent exploratory laparotomy is required for all blunt abdominal trauma patients with signs of peritoneal irritation and/or hemodynamic instability. The patient described in this question has suffered severe blunt abdominal trauma and has diffuse abdominal tenderness, guarding and rigidity on physical examination, all indicators of peritonitis. The most common causes of peritonitis in blunt abdominal trauma patients are hollow viscus rupture and pancreatic damage. This patient also has tachycardia, hypotension, collapsed neck veins and altered mental status, signs of hemorrhage leading to hypovolemic shock. Physical examination of his thorax is comparatively benign, making the abdomen the most likely location of his blood loss. Emergent exploratory laparotomy will allow for rapid identification and treatment of the hemorrhage as well as direct assessment of the abdominal viscera for perforation or other damage.

**(Choice 1)** Diagnostic laparoscopy is not ideal for hemodynamically unstable patients.

**(Choice 2)** It is reasonable to presume that the source of bleeding in this patient is the abdomen based on clinical examination findings. Laparotomy should not be delayed for imaging studies.

**(Choice 3)** CT scan of the abdomen to diagnose intraabdominal or retroperitoneal bleeding should only be done in hemodynamically stable patients. The FAST (Focused Assessment with Sonography for Trauma) ultrasound examination may be used in the acute setting to assess for free fluid in four regions within the peritoneum.

**(Choice 5)** Diagnostic peritoneal lavage is done in blunt abdominal trauma patients to determine if intraperitoneal bleeding has occurred. This procedure has largely been replaced by the FAST exam. The presence of intraabdominal pathology is evident based on physical examination in this case, and further diagnostic studies are not required to corroborate this.

161. Question

1 points

**Category: Surgery**

A 12-year-old male is brought to the emergency department after direct blunt trauma to the upper abdomen. He has epigastric pain and repeated vomiting immediately after the trauma. He is afebrile and his other vital signs are stable. Barium examination shows duodenal obstruction. CT scan of the abdomen shows a duodenal hematoma and no other injuries are noted. Which of the following is the most appropriate next step in management?

- 1. ☐ Exploratory laparotomy

2. ☐ Nasogastric suction with parenteral nutrition ☐
3. ☐ Bowel rest and antibiotics
4. ☐ Endoscopic removal of the hematoma
5. ☐ MRI of the abdomen

**INCORRECT** ☐

**The correct answer is 2.**

Duodenal hematomas most commonly occur following direct blunt abdominal trauma and are more commonly seen in children. Following trauma, blood collects between the submucosal and muscular layers of the duodenum causing obstruction. Patients classically present with epigastric pain and vomiting due to the failure to pass gastric secretions past the obstructing hematoma. Most hematomas will resolve spontaneously in 1-2 weeks, and the intervention of choice is nasogastric suction and parenteral nutrition. Surgery may be considered to evacuate the hematoma if this more conservative method fails.

**(Choice 1)** Exploratory laparotomy is indicated only if there are other intraabdominal injuries following trauma such as hemorrhage or bowel perforation. Duodenal hematoma is best treated conservatively. If surgical intervention is required, it will be a focused laparotomy or a laparoscopic procedure to evacuate the hematoma.

**(Choice 3)** Antibiotics are not indicated in this patient as he is afebrile and has no symptoms suggestive of infection.

**(Choice 4)** Surgical removal of the hematoma is only attempted after conservative measures have failed. Laparotomy or laparoscopy is accepted methods of accomplishing evacuation of the hematoma.

**(Choice 5)** MRI will not provide any additional information relevant to this patient's condition. CT with oral contrast is the investigation of choice for evaluating the duodenal hematomas.

162. Question

1 points

**Category: Surgery**

A 24-year-old male football player fell on his outstretched hand while running with the ball, hoping to make a touchdown. He was writhing in pain and had to be taken to the emergency room of a local hospital. The patient complained of severe pain in his right arm. His vital signs were: blood pressure, 140/80; pulse, 98/min regular; temperature 37°C (98.6°F); and respirations 22/min and regular. The right arm was swollen and angulated in the midarm area. It was tender to touch, and movement was painful. The humeral shaft appeared to be fractured. Capillary circulation in the nail beds was normal. However, there was clinical evidence of nerve damage. The arm was splinted, and the patient was given narcotic analgesia to minimize the pain. An x-ray film of the arm confirmed fracture of the humeral shaft, with some angular displacement. Which of the following is the nerve injury associated with this fracture?

1. ☐ Axillary nerve
2. ☐ Median nerve
3. ☐ Ulnar nerve
4. ☐ Radial nerve ☐
5. ☐ Brachial plexus

**INCORRECT** ☐

**The correct answer is 4.**

Fractures of the shaft of the humerus involve the radial nerve, which winds around its posterior aspect, in the radial groove. As a result, a wrist drop may be present.

**(Choice 1)** Dislocations of the shoulder or fractures involving the surgical neck of the humerus may be associated with trauma to the axillary nerve. In such an event, sensations over the lateral aspect of the shoulder will be impaired.

**(Choice 2)** may be traumatized in supracondylar fractures of the humerus. The brachial artery may be compressed as well.

**(Choice 3)** can be injured after posterior dislocation of the elbow.

**(Choice 5)** is not injured in fractures of the upper extremities. Acute lateral flexion of the neck (e.g., after a fall) can damage the lower cord of the brachial plexus.

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### 163. Question

**1 points**

#### **Category: Surgery**

A 34-year-old male is involved in a high-speed highway motor vehicle collision. He is intubated by rescue workers at the accident scene. In the emergency department, the patient has decreased breath sounds on the right side, normal breath sounds on the left, and hypotension. A right-sided chest tube is placed. Physical examination reveals multiple bruises over the entire chest wall as well as subcutaneous emphysema. A few hours later, his chest x-ray shows an accumulation of air in the pleural space as well as pneumomediastinum. Which of the following is the most likely diagnosis?

1. ☐ Myocardial contusion
2. ☐ Bronchial rupture ☐
3. ☐ Myocardial rupture
4. ☐ Esophageal rupture

5. ☐ Diaphragmatic rupture

**INCORRECT** ☐

**The correct answer is 2.**

This patient has suffered rapid deceleration chest trauma, likely in association with forceful impact with his vehicle's steering wheel. Chest radiography is the most important initial diagnostic study in all stabilized patients (airway, breathing and circulation secure) following blunt chest trauma. This patient's chest x-ray shows a persistent pneumothorax despite chest tube placement and pneumomediastinum, and he has subcutaneous emphysema (palpable crepitus below the skin) on physical examination. Though rare, the most likely explanation for these radiographic and clinical findings is tracheobronchial perforation secondary to blunt thoracic trauma. The right main bronchus is most commonly injured in these cases. The diagnosis can be confirmed with high-resolution CT scanning, bronchoscopy, or surgical exploration. Operative repair is indicated.

**(Choice 1)** Myocardial contusion classically causes tachycardia, new bundle branch blocks or arrhythmia. Sternal fracture is a commonly associated injury.

**(Choice 3)** Myocardial rupture causes cardiac tamponade, which manifests with muffled heart sounds, hypotension and distended neck veins. The diagnosis can be made rapidly with ultrasound, and emergent surgical repair is warranted.

**(Choice 4)** Esophageal rupture following blunt trauma is rare. Iatrogenic (e.g., with endoscopy) and esophagitis-related etiologies are more common. Manifestations of esophageal rupture include pneumomediastinum and pleural effusions.

**(Choice 5)** Patients suffering diaphragmatic rupture may experience abdominal pain, pain referred to the shoulder, shortness of breath, and/or vomiting. Radiographic studies may show abdominal viscera above the diaphragm and/or loss of the diaphragmatic contour.

164. Question

1 points

**Category: Surgery**

A 26-year-old, drug-addicted man develops congestive heart failure over a period of a few days. He is febrile, has a loud, diastolic murmur at the right second intercostal space, and has a blood pressure of 120/20 mm Hg. A physical examination performed a few weeks ago, when he attempted to enroll in a detoxification program, was completely normal. His blood pressure at that time was 120/80 mm Hg, and no murmurs were noted. In addition to long-term antibiotic therapy, which of the following is the most appropriate next step in management?

1. ☐ Closure of the ventricular septal defect with a pericardial patch
2. ☐ Elective aortic valve repair if he develops a systolic gradient of 50 mm Hg
3. ☐ Emergency aortic valve replacement ☐

4. ☐ Emergency mitral valve repair
5. ☐ Emergency pulmonic valve replacement

**INCORRECT** ☐

**The correct answer is 3.**

You probably had no trouble discerning that bacterial endocarditis, triggered by the use of non-sterile IV drugs, damaged a heart valve in this man. Although we usually think of the right-sided valves as the ones that are first in line to catch the bugs, any valve can become the seat of infection. The clinical presentation leaves no doubt that the aortic valve is the one that has been destroyed: the murmur is diastolic, at the right base, and the very low diastolic pressure reveals the incompetence of the aortic valve. Furthermore, this was not a slow process allowing for compensation: he is in failure and close to death. He needs a new valve, pronto.

**(Choice 1)** would have been more appropriate for a massive myocardial infarction producing a septal defect. The clinical presentation would have been different, with a systolic murmur and normal diastolic pressure.

**(Choice 2)** is wrong for at least two reasons: it would not address an acute problem, and the criteria given were those for long-standing aortic stenosis (not insufficiency).

**(Choice 4)** does not produce the symptoms described.

**(Choice 5)** is not the culprit either. If it were destroyed, it would give few manifestations (it is almost a “disposable” valve).

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165. Question

1 points

**Category: Surgery**

A 78-year-old diabetic man has undergone surgical repair of a large abdominal aortic aneurysm. Postoperatively, he develops left lower quadrant abdominal pain followed by bloody diarrhea. He has a history of prostate cancer and received radiation therapy several years ago. He eats a low fiber diet. He quit smoking recently. Vital signs show a low grade fever. Examination shows tenderness in the left lower quadrant and rectal examination reveals blood in the stool. CT scan of the abdomen demonstrates thickening of the colon at the rectosigmoid junction. On colonoscopy, ulcerations are seen in the same area while the colon above and below the lesions is completely normal. Which of the following is the most likely cause of his symptoms?

1. ☐ Acute diverticulitis
2. ☐ Radiation proctitis
3. ☐ Clostridium difficile colitis

4. ☐ Ischemic colitis ☐
5. ☐ Inflammatory bowel disease

**INCORRECT** ☐

**The correct answer is 4.**

The patient described is experiencing colonic ischemia and infarction following surgical repair of an abdominal aortic aneurysm. Colonic ischemia follows up to 7% of such procedures due to interference of blood flow to the distal left colon. Common causes include loss of collateral circulation, manipulation of vessels with surgical instruments, prolonged aortic clamping and impaired blood flow through the inferior mesenteric artery. Patients classically present acutely following the procedure with dull abdominal pain in the area overlying the ischemic bowel and bloody diarrhea. X-rays of colonic ischemia are usually nonspecific except in cases of advanced disease. CT scan will show thickening of the bowel wall. Colonoscopy characteristically shows cyanotic mucosa with hemorrhagic ulcerations. There is typically a sharp transition from affected to unaffected mucosa with only a segment of bowel affected by ischemia.

**(Choice 1)** Acute diverticulitis would cause left lower quadrant pain, and diverticulae may cause rectal bleeding, but frequently rectal bleeding does not occur in the setting of acute diverticulitis. Additionally, colonoscopy would reveal diverticulae in this condition.

**(Choice 2)** Radiation proctitis is characterized clinically by diarrhea, rectal bleeding, tenesmus and incontinence. Later, strictures and fistulae may form.

**(Choice 3)** Clostridium difficile colitis (pseudomembranous colitis) typically causes abdominal pain, fever and watery diarrhea. The diagnosis can be confirmed with colonoscopy or, more commonly, by detecting toxin in the stool with ELISA.

**(Choice 5)** Inflammatory bowel disease (180) can be differentiated from colonic ischemia both by the acute onset of the latter as well as differences in appearance on colonoscopy. Namely, ischemia typically spares the rectum and involves only a segment of the colon while 180 does not.

166. Question

1 points

**Category: Surgery**

A 29-year-old man presents to the emergency room with a history of pain and swelling in the left side of the scrotum of 4 days' duration. There is no history of trauma. He did have sex recently with a woman whom he had met through the Internet, and he did not use a condom. The patient reported a burning sensation while passing urine, but no other problems. Physical examination revealed a young man in moderate distress, walking with a broad-based gait to avoid hurting his scrotum with his thighs. Examination of the genitalia revealed no penile abnormality or discharge



through the urethra. Examination of the scrotum revealed dilated veins under the scrotal sac on the left side, which was tender to touch. Which of the following conditions is a possible diagnosis that must be excluded or confirmed?

1. ☐ Torsion of the testis
2. ☐ Incarcerated inguinal hernia
3. ☐ Fournier's gangrene
4. ☐ Epididymitis caused by chlamydia
5. ☐ Renal carcinoma ☒

**INCORRECT** ☐

**The correct answer is 5.**

This patient has a varicocele involving the pampiniform plexus of veins. The classic description of this is that it feels like a bag of worms. Varicoceles are benign conditions and may be associated with a small hydrocele. However, the main concern on the left side is the presence of a latent renal carcinoma that can herald itself by presenting as a varicocele. This is because, whereas the right testicular vein drains directly into the inferior vena cava, in contrast, the left testicular vein drains into the left renal vein. As a consequence, renal carcinoma can infiltrate into the left renal vein and block the inflow of blood from the left testicular vein, leading to backup and dilated veins in the scrotum. In such instances, the varicocele will not decompress when the patient is lying supine. Hence, the presence of renal carcinoma should be excluded at the earliest, rather than just dealing with the varicocele itself.

**(Choice 1)** is an unlikely diagnosis. This is usually associated with severe lower abdominal pain, retching, and vomiting, and the testis will be exquisitely tender. Moreover, the testis will be lying in a horizontal position.

**(Choice 2)** This man also does not have an incarcerated inguinal hernia. An incarcerated inguinal hernia will usually extrude from the inguinal canal into the scrotum. The scrotum will be swollen and tender. Dilated veins will not be found. The hernia will be distinct from the testis and will fail to reduce. Furthermore, one will not be able to "get above the swelling."

**(Choice 3)** Fournier's gangrene, also known as idiopathic scrotal edema, is a rare condition. Scrotal inflammation occurs suddenly, followed by rapid onset of gangrene. This leads to sloughing of the scrotal skin. Patients usually have severe scrotal pain, fever, prostration, and pallor. Treatment involves antibiotics and analgesics.

**(Choice 4)** Epididymitis in young men most commonly results from sexually transmitted disease. Chlamydia is the leading cause, followed by gonorrhea. The epididymis is tender to palpation; however, no dilated veins or scrotal swelling is noted. If it spreads to the testis, the resultant disorder is called epididymo-orchitis.

## 167. Question

1 points

## Category: Surgery

A 60-year-old man complains of anal itching and discomfort, particularly toward the end of the day. He works as a salesman in a department store, where he has to be on his feet all day. When he goes home in the evening, he finds himself sitting sideways to avoid the discomfort. He has no fever, rectal bleeding, or soiling of his underwear, and he has never had surgery in that area. Which of the following is the most likely diagnosis?

1. ☐ Anal fissure
2. ☐ External hemorrhoids ☐
3. ☐ Fistula in ano
4. ☐ Internal hemorrhoids
5. ☐ Perirectal abscess

INCORRECT ☐**The correct answer is 2.**

As a rule, internal hemorrhoids bleed but do not hurt, whereas external hemorrhoids hurt but do not bleed. This is the typical symptomatology of external hemorrhoids.

**(Choice 1)** occurs in young women, who have excruciating pain when they have a bowel movement and blood streaks on the toilet paper.

**(Choice 3)** occurs in people who have had a perirectal abscess drained. The typical complaint is soiling of the underwear from the drainage of the fistula.

**(Choice 4)** As pointed out above, internal hemorrhoids tend to bleed, but they have no innervation for pain.

**(Choice 5)** would cause very intense pain, along with fever, and would have a short clinical course ending with spontaneous drainage of pus, if not surgically drained first.

## 168. Question

1 points

## Category: Surgery

A 49-year-old man crashes his car against a bridge abutment at high speed. On arrival at the emergency department, he is breathing well, but he has multiple bruises over the chest, and there is a specific spot at about the middle of the sternum that is exquisitely painful to touch. Gentle palpation of that area elicits a gritty feeling of bone grating on bone. He distinctly recalls hitting the steering wheel with his chest and is certain that he hurt that particular spot in that manner. Anteroposterior and lateral chest x-ray films confirm that he has a sternal fracture. The films do not

show any mediastinal widening or mediastinal air, and both lung fields are clear. His vital signs are normal, and he does not have subcutaneous emphysema. Which of the following studies is most likely to show evidence of additional injuries?

1. ☐ Serial ECGs ☐
2. ☐ Abdominal x-ray films
3. ☐ Gastrografin swallow
4. ☐ Bronchoscopy
5. ☐ Esophagoscopy

**INCORRECT** ☐

**The correct answer is 1.**

A sternal fracture is very likely to be complicated by myocardial contusion, which may not be evident immediately but will show up in serial ECGs with signs very similar to those of a myocardial infarction.

**(Choice 2)** would not add to our present information. If he had free air under the diaphragms, or had a diaphragmatic rupture with bowel in the chest, both would be seen in his chest x-ray films.

**(Choice 4)** An injury of the tracheobronchial tree would produce pneumothorax, mediastinal air, or subcutaneous emphysema, so bronchoscopy would not be warranted.

**(Choices 3 & 5)** The esophagus typically gets injured during instrumentation or by penetrating injuries. Blunt trauma does not disrupt it, so a Gastrografin swallow or esophagoscopy would not be necessary.

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169. Question

1 points

**Category: Surgery**

A 49-year-old blue-eyed blonde woman was brought to the emergency room with a history of having come down heavily on the right leg while stepping off a curb. The paramedics reported that she had vomited once during the trip. The patient stated that she had had a dull ache in the right thigh for the past few weeks and had noticed a "boil" there. She had made an appointment to see her primary care physician for this and for recent onset of hot flushes (also called hot flashes). The emergency physician noted that she was in moderate distress. Her blood pressure was 90/60 mm Hg, pulse was 98/min regular and thready, her respirations were 22/min, and her temperature was 37.5 °C (99.5 °F). She had no cyanosis, but had pallor of the mucosa. Cardiovascular examination was unremarkable except for a sinus tachycardia and a capillary circulation longer than 2 seconds. Examination of the respiratory system revealed normal breath sounds bilaterally. Her right thigh was swollen, and she had lateral rotation and shortening of the leg. The right groin was tender to

palpation, and movement of the leg induced severe pain. There was a raised papular lesion over anterior mid-thigh, surrounded by inflammation. The pelvis and the left leg were normal. Which of the following choices is the most likely reason for her problem?

1. ☐ Chronic osteomyelitis
2. ☐ Osteoporosis
3. ☐ Stress fracture
4. ☐ Osteogenesis imperfecta
5. ☐ Metastatic bone disease ☐

**INCORRECT** ☐

**The correct answer is 5.**

As a result of sustaining a spontaneous fracture of the neck of the femur, this patient is in hemorrhagic shock. Among the choices offered to account for this fracture, metastatic bone disease is the most probable. Metastases in bone cause lytic lesions, thereby weakening the bone and possibly leading to a spontaneous fracture. The primary cancer may arise in any of several tissues, including breast, small-cell carcinoma of the lung, and follicular carcinoma of the thyroid. Lytic lesions are also found in multiple myeloma, which is the most common primary hematologic malignancy of bone, and in osteosarcoma, the most common primary cancer of bone. Nonmalignant diseases causing pathologic (spontaneous) fractures include bone cysts, Paget's disease of bone (in which the fractures are usually transverse and usually involve the femur or the tibia), osteogenesis imperfecta, and osteoporosis.

**(Choice 1)** Chronic (not acute) osteomyelitis results from acute hematogenous infection to the bone that may or may not have been treated adequately. The condition is usually quiescent for several months or even years before it flares up. The patient has fever, prostration, local inflammation, and a draining sinus. This patient had a furuncle on her thigh, not a draining sinus. Fractures are unusual in a setting of chronic osteomyelitis. Treatment is surgical, and cure is difficult. The goal is to remove the sequestrum (dead bone), which is a continual nidus for infection.

**(Choice 2)** is unlikely. Notwithstanding the hot flushes that she has been experiencing recently, the patient is still premenopausal. Declining bone density in women usually commences shortly after menopause, but frank osteoporosis is rare before the age of 65. Colles' fracture, fracture of the proximal humerus, neck of the femur, and collapse of the vertebra are the most common fractures associated with osteoporosis. Only femoral neck fracture and vertebral collapse are not preceded by a history of fall.

**(Choice 3)** are caused by repetitive excessive load on the bones. This can involve the second and third metatarsals (march fracture), which was initially noted in infantrymen during long marches, and femoral neck in the case of young soldiers who have to march for great distances carrying a full, heavily loaded backpack. Stress fractures can also involve the tibiae in runners, especially when they run over uneven surfaces. Physical examination usually reveals localized tenderness without deformity. A radiograph may not show the fracture,

especially in the early stages. A bone scan using  $^{99m}\text{Tc}$ -labeled bisphosphonate will clinch the diagnosis, by demonstrating increased uptake at the site. Most stress fractures resolve with rest.

**(Choice 4)**, also known as brittle bone disease, presents itself in four forms, of varying severity. Type I is the most common form and is associated with a blue sclera 98% of the time (not blue irises, as in this woman); typically, fractures are not excessive and primarily occur prior to puberty. Type II manifests in utero or in infancy and is lethal. Type III is relatively rare; fractures abound, causing bone deformities such as scoliosis and deformed limbs and may result in dwarfism. Blue sclera is also a prominent symptom in types II and III. Type IV is similar to type I but much rarer and differs in that blue sclera are not seen. Both types I and IV are associated with childhood fractures after minimal trauma and are easily mistaken for child abuse, particularly type IV, in which blue sclera are not present. Although in both type I and IV fractures become less frequent after growth ceases, the bone structure remains less dense than normal, making then susceptible to fractures throughout life and to osteoporosis as the patients age. Types I and IV are autosomal dominant, and commonly, cases can be traced back several generations. In contrast, type II and III cases lack a family history and are either autosomal recessive conditions or new mutations.

#### 170. Question

1 points

##### Category: Surgery

A full-term, female infant is born to a 26-year-old, primigravid mother via C-section secondary to breech position. The mother has lived in New York City for the past 5 years. She denies the use of any drugs, alcohol or cigarettes during her pregnancy. She denies having any sexually transmitted infections. Her lead levels were within the normal range throughout her pregnancy. Prenatal ultrasound done at 30 weeks gestation showed normal anatomy of the fetus. The Apgar scores at 1 and 5 minutes are 7 and 9, respectively. There are some bluish-brown spots located on the infant's lumbosacral area. Flexion and abduction of the lower extremities reveal a palpable clunk. The rest of the physical examination is normal. Which of the following is the best next step in the management of this patient?

1. ☐ Ultrasound of the hips ☐
2. ☐ Reassurance
3. ☐ Ultrasound of the spinal cord
4. ☐ X-ray of the hips
5. ☐ X-ray of the lumbosacral region

INCORRECT ☐

**The correct answer is 1.**

Developmental dysplasia of the hip (DOH) comprises a group of disorders that involves any abnormal relationship between the proximal femur and the acetabulum. Proper formation of the femoral head and acetabulum depends on the proper articulation of these bony structures. Failure of these bony elements to contact one another properly may cause defects in maturation of both structures. Such errors in contact between the femoral head and acetabulum result in hips that are subluxable, dislocated, dislocatable or dysplastic. DOH has been associated with the following factors: Caucasian race, female gender, first-born infants, breech position, family history of DOH and other congenital abnormalities. The maneuvers used to screen for DOH in the newborn are the Barlow and Ortolani tests, which act to dislocate and relocate affected infants' hips, respectively. Ancillary tests to aid in the diagnosis are ultrasound in patients less than 4 months old and radiographs in patients over 4 months old. Ultrasound is preferred in patients less than 4 months of age because at that age the femoral head and acetabulum have not yet ossified, so plain x-rays are poorly capable of illustrating the patient's anatomy. Treatment may involve use of a hip (Pavlik) harness, spica cast or surgical reduction.

**(Choice 2)** Reassurance in the setting of an abnormal physical exam, such as a positive Ortolani test, is not the best option.

**(Choices 3 & 5)** The lesions on the patient's lumbosacral region are most likely Mongolian spots, which are normally seen in some newborns. Imaging studies of the lumbosacral area are indicated when a midline defect, such as spina bifida, meningocele or myelomeningocele, is suspected. Classic cutaneous findings associated with spinal dysraphism include a midline dimple or tuft of hair.

**(Choice 4)** X-ray is used as a diagnostic test for DOH when the patient is more than 4 months old. At that age, the acetabulum has begun the process of ossification and can thus be visualized with radiography.

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## 171. Question

1 points

### Category: Surgery

A 68-year-old man with intermittent, cramping abdominal pain also has difficulty defecating. He manages a bowel movement every third or fourth day only with a great deal of straining and then only passes small hard feces with a lot of mucous and sometimes fresh blood. His physician suspects obstipation and orders a barium enema that reveals a massively dilated sigmoid colon with a column of barium resembling a "bird's beak." Which of the following is the most likely diagnosis?

- 1. ☐ Intussusception
- 2. ☐ Volvulus of the sigmoid colon ☐
- 3. ☐ Toxic megacolon



- 4. ☐ Ogilvie syndrome
- 5. ☐ Impacted stool

**INCORRECT** ☐

**The correct answer is 2.**

The patient has volvulus of the sigmoid colon. Volvulus is a twisting of the bowel around the mesenteric root. It is most common in the sigmoid colon (65%) and is most often seen in the elderly population. Obstruction and strangulation with infarction are potential sequelae.

Clinical signs include colicky abdominal pain, abdominal distention, and vomiting. In sigmoid volvulus, there is a single dilated loop of bowel resembling a “coffee bean” rising up out of the pelvis. The concavity of the coffee bean points toward the left lower quadrant. Barium studies reveal a “bird’s beak” or “ace of spades” appearance, with the lumen of the bowel tapering toward the volvulus. A volvulus can frequently be decompressed with a flexible colonoscope, but it often recurs. If it cannot be decompressed, then surgery should be performed with resection of the redundant bowel.

**(Choice 1)** is uncommon in adults. It refers to the telescoping of one segment of proximal bowel into the distal bowel. In adults, it commonly results from an underlying mucosal lesion that serves as the nidus for the intussusception, producing obstruction and strangulation of the bowel. Bloody diarrhea and a palpable mass are usually present.

**(Choice 3)** is associated primarily with ulcerative colitis. The diameter of the descending colon exceeds 6 cm. Perforation is a common complication. The patient does not have a history compatible with ulcerative colitis (e.g., intermittent bouts of bloody diarrhea).

**(Choice 4)** is a pseudo-obstruction of the ascending colon in elderly persons. There is a sudden, massive distention of the colon without pain or tenderness. The right colon is distended with a cutoff at the splenic flexure. Barium studies are negative for obstruction.

**(Choice 5)** would not likely result in complete obstruction.

172. Question

1 points

**Category: Surgery**

Eight days after a difficult hemigastrectomy and gastro duodenostomy for gastric ulcer, a patient begins to leak 2 to 3 L of greenish fluid per day through the right corner of his bilateral subcostal surgical incision. He is afebrile and has no clinical signs of an acute abdomen. At surgery, a feeding catheter jejunostomy was placed, through which the patient has been receiving 3 L/day of elemental diet with a caloric content of 1 cal per mL, and 1 g nitrogen per 100 cal. The nursing staff has rigged a very effective collection device for the fluid that is leaking through the wound, and the skin around the site is well protected. Which of the following is the most appropriate next step in management?

- 1. ☐ No changes in the present therapeutic plan

- 2. ☐ Addition of 2 to 3 L per day of IV Ringer's lactate ☐
- 3. ☐ Immediate discontinuation of the jejunal feeding, and replacement by 5 L/day of IV 5% dextrose-half normal saline
- 4. ☐ Surgical drainage of the operative area
- 5. ☐ Surgical reconstruction of the gastroduodenostomy

**INCORRECT** ☐

**The correct answer is 2.**

The patient obviously has developed a fistula at the operative site, but there are no signs that the gastrointestinal contents are spilling into the abdomen (no signs of an acute abdomen) or collecting inside a pocket (no fever). Thus, we can provide general support and wait for the fistula to close. He is already getting two of the essential components of therapy: the skin is well protected, and he is getting good nutritional support distal to the fistula, with a feeding solution that does not stir up enzymatic activity (elemental diet) and that is rich in protein (a calorie-nitrogen ratio lower than 150). But he needs replacement of the fluids and electrolytes pouring out through the fistula. The green fluid indicates a duodenal origin (alkaline fluid), so Ringer's lactate is a suitable replacement fluid. Cramming 6 L a day via the jejunostomy might be too much; thus, the IV route is better for the additional fluid.

**(Choice 1)** No change in therapy would lead to prompt dehydration and electrolyte depletion. He needs the 3 L per day of jejunal feeding for his own needs. The fistula losses have to be replaced separately.

**(Choice 3)** Stopping the nutritional support would not help the fistula to close. If he had been eating meat and potatoes by mouth, they would have had to be stopped. As he is, however, the feeding does not disturb the fistula. Furthermore, 5% dextrose (D5)-half normal saline would be a poor choice of IV fluid to replace alkaline losses from the duodenum.

**(Choice 4)** Surgical drainage addresses a nonexistent problem. The gastrointestinal fluid is already coming out, not pooling inside.

**(Choice 5)** As for surgical reconstruction, it might have to be done if conservative management does not lead to fistula closure. But one does not begin with such a high-risk, technically difficult step. Most fistulas close if there is no foreign body, epithelialization, tumor, infection, or distal obstruction to prevent it.

173. Question

1 points

**Category: Surgery**

A 56-year-old man presents to his urologist for continued evaluation of hypertension and hematuria. The patient has a 10-year history of hypertension and recent onset of painless hematuria for which he sought the attention of an urologist 3 months ago. On detailed questioning, the man states that

he has been having severe headaches that are refractory to narcotic analgesics. Three days ago, a renal ultrasound was obtained that demonstrated bilaterally enlarged kidneys with multiple cysts. Which of the following is the most appropriate next step in diagnosis?

1. ☐ CT scan of the pelvis
2. ☐ CT scan of the thorax
3. ☐ MRI of the brain
4. ☐ Intravenous pyelography (IVP)
5. ☐ Magnetic resonance angiogram (MRA) of the brain ☐

**INCORRECT** ☐

**The correct answer is 5.**

This patient has adult onset polycystic kidney disease (APKD). APKD is an autosomal dominant disease that presents with hypertension, renal cysts, hematuria, and possible renal failure, usually after age 30. There is a 10 to 20% incidence of berry aneurysms in these patients, and they need to be screened with angiography to determine the presence or absence of these malformations. A magnetic resonance angiogram (MRA) of the brain is the standard option for such imaging in most medical centers.

**(Choice 1)** is not indicated since clinical history and renal ultrasound alone can make the diagnosis of APKD. The concern here is to screen for the concomitant presence of intracranial pathology.

**(Choice 2)** is incorrect. Unless these lesions were mistaken for renal cell carcinoma, there is no indication to scan a distant site like the lungs as this disease has no malignant potential.

**(Choice 3)** is not useful for detecting circulatory malformations without the aid of angiographic contrast material.

**(Choice 4)** is used to evaluate the collecting system of the urinary tract and is not indicated in this case, as the diagnosis of APKD is almost certainly based on the ultrasound and clinical presentation. This study adds no diagnostic information to the results of the ultrasound already obtained.

174. Question

1 points

**Category: Surgery**

A 12-year-old male is brought to the physician because of a two week history of right groin pain and limping. He is at the 60th percentile for height and the 90th percentile for weight. He is afebrile and his other vital signs are within normal limits. Examination shows the range of motion of the right

knee joint is within normal limits, but hip movements are restricted and the right foot points medially. There is marked external rotation of the right thigh on flexion of the hip. After confirming the diagnosis, which of the following is the most appropriate management?

1. ☐ Aspiration and microscopic examination of the hip joint synovial fluid
2. ☐ Conservative management with rest and analgesics
3. ☐ Closed reduction of the hip joint
4. ☐ Immediate osteotomy of the femoral neck
5. ☐ External fixation of the hip joint with pins ☐

**INCORRECT** ☐

**The correct answer is 5.**

This adolescent has a slipped capital femoral epiphysis (SCFE). SCFE is characterized by displacement of femoral head on the femoral neck due to disruption of the proximal femoral growth plate. This condition is commonly seen in obese adolescent boys. The physis, the physical junction between the femoral head and neck weakens during early adolescence because it is rapidly expanding and composed primarily of cartilage, which does not possess the strength of bone. When exposed to excessive shear stress, which is magnified by obesity, the physis fractures and the femoral head slips posteriorly and medially relative to the femoral neck. Patients typically present with hip or knee pain of insidious onset causing limping. Acute presentations may occur. Diagnosis requires a high degree of clinical suspicion because knee pain, not hip pain, is a common presenting complaint with this condition. Physical examination shows loss of abduction and internal rotation of the hip, and patients hold the thigh in external rotation while the hip is being flexed. A frog-leg lateral view x-ray of the hip is the diagnostic imaging technique of choice. SCFE should be treated promptly with surgical pinning of the slipped epiphysis where it lays (in situ) in order to lessen the risk of avascular necrosis of femoral head and chondrolysis.

**(Choice 1)** Joint aspiration and microscopic analysis would be useful in the diagnosis of a septic joint or a crystal-induced arthropathy.

**(Choice 2)** Conservative management with rest and analgesics is indicated for the treatment of tendinous or ligamentous strains.

**(Choice 3)** Closed reduction is not advised due to the risk of further damage to the tenuous blood supply of femoral head, which may lead to avascular necrosis.

**(Choice 4)** Corrective osteotomies may cause a vascular necrosis and may not correct the exact anatomic deformity. They are usually undertaken later in treatment if a patient experiences persistent pain and limitation of range of motion after initial repairs and attempted rehabilitation.

## 175. Question

1 points

## Category: Surgery

A 62-year-old man who had a motorcycle accident has been in a coma for several weeks. He is on a respirator, has had pneumonia on and off, has been on pressors, and shows no signs of neurologic improvement. The family inquires about brain death and possible organ donation. An independent neurologic evaluation confirms that the patient is brain dead. What advice should be given to his family?

1. ☐ Anyone who has had pneumonia is excluded as a donor
2. ☐ He is not a suitable donor because of his age
3. ☐ Patients on respirators cannot donate organs
4. ☐ The harvesting team should evaluate him as a potential donor ☐
5. ☐ The use of pressors precludes organ donation

INCORRECT ☐**The correct answer is 4.**

Nowadays, when thousands of patients are awaiting transplants and many die before they get them, every potential donor should be evaluated by the experts. They may indeed reject some, but probably very few. For instance, corneas can be harvested even from people with cancer, and donors with chronic viral infections can be used for patients who have the same viral disease.

All the other options were at one time or another used to exclude donors. These situations still make solid organs less attractive, but not to the extent that evaluation should be precluded.

## 176. Question

1 points

## Category: Surgery

A 72-year-old man has a 4-cm hard mass in the left supraclavicular area. The mass is movable and nontender and has been present and steadily growing for the past 3 months. On direct questioning the only additional findings include a 20-pound weight loss and a vague feeling of epigastric discomfort over the past 2 months. Physical examination shows evidence of the weight loss but no other significant findings in the abdominal examination. The supraclavicular mass is an obvious, but no other mass can be felt anywhere else in the neck, axillas, or groins. There is occult blood in the stool, and his hemoglobin is 10.5 g/dL. Which of the following would a biopsy of the supraclavicular mass most likely reveal?

1. ☐ Chronic inflammation
2. ☐ Lymphoma
3. ☐ Metastatic gastric cancer ☐
4. ☐ Metastatic squamous cell carcinoma
5. ☐ Metastatic thyroid cancer

**INCORRECT** ☐

**The correct answer is 3.**

The rule is that lymph nodes that progressively enlarge over several months are malignant. Furthermore, when they are in the supraclavicular area, they typically harbor metastasis from a primary tumor below the clavicles (i.e., not in the head and neck). In this case, gastric cancer was the only choice offered that fit the rule, and the rest of the vignette is actually suggestive of that particular malignancy. Don't be put off by the inability to feel it by palpation; gastric cancers are seldom palpable.

**(Choice 1)** Inflammatory nodes typically have a timetable of weeks rather than months, and they would not explain weight loss, epigastric discomfort, and occult blood in the gastrointestinal tract.

**(Choice 2)** would have been an excellent choice in a young person with fever, night sweats, and multiple enlarged lymph nodes at several locations.

**(Choice 4)** would have been perfect for an old man who smokes and drinks and has rotten teeth, if the node had been higher up in the neck.

**(Choice 5)** would likewise metastasize to the jugular nodes before it would involve the supraclavicular area.

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177. Question

1 points

**Category: Surgery**

A 72-year-old man underwent surgical repair of an aneurysm of the infrarenal aorta. He received perioperative prophylaxis with a second-generation cephalosporin antibiotic. On the first postoperative day he complains of progressive abdominal pain and bloody diarrhea. His temperature is 38.5 °C (101 °F), blood pressure is 110/65 mm Hg, pulse is 110/min and respirations are 22/min. His abdomen is mildly distended and tender to palpation. The tenderness is mostly in the left lower quadrant without rebound. Femoral pulses are full and symmetric. His white blood cell count is 12,000/mm<sup>3</sup>. Which of the following is the most likely diagnosis?

1. ☐ Pseudomembranous colitis
2. ☐ Invasive infectious diarrhea



3. ☐ Aortoenteric fistula
4. ☐ Ischemia of the bowel ☐
5. ☐ Perforation of the colon

**INCORRECT** ☐

**The correct answer is 4.**

Bowel ischemia is one known complication (1- 7% incidence) of abdominal aortic aneurysm repair. It results from inadequate colonic collateral arterial perfusion to the left and sigmoid colon after loss of the inferior mesenteric artery during aortic graft placement. Patients present with abdominal pain and bloody diarrhea. Fever and leukocytosis may also be present. This adverse effect can be minimized by checking sigmoid colon perfusion following placement of the aortic graft.

**(Choice 1)** C. difficile is the most common cause of nosocomial diarrhea.

Pseudomembranous colitis occurs following antibiotic treatment and most commonly causes a voluminous watery diarrhea in addition to abdominal pain and fever. Bloody diarrhea is rare. Also, it is uncommon to develop C. difficile infection so early after the antibiotic use (typically takes 4-5 days).

**(Choice 2)** Invasive diarrhea, such as that caused by E. coli (EIEC) or Shigella manifests with bloody, purulent diarrhea and tenesmus. These are less likely in this setting.

**(Choice 3)** Aortoenteric fistula is a rare and late complication where the duodenum erodes into the proximal part of the aortic graft.

**(Choice 5)** Iatrogenic bowel perforation may be suspected after any abdominal operation. Signs of peritoneal irritation are usually present. Bloody diarrhea is usually not a feature of perforation.

178. Question

1 points

**Category: Surgery**

A 25-year-old man presents to the same day surgical center for repair of an old injury to his lateral collateral ligament. The anesthesiologist wants to perform an axillary block for local pain control. If the posterior wall of the axillary artery is pierced during placement of the block, which of the following nerves will most likely be affected?

1. ☐ Axillary
2. ☐ Median
3. ☐ Musculocutaneus
4. ☐ Radial

5. ☐ Ulnar ☐

**INCORRECT** ☐

**The correct answer is 5.**

This question simply requires a basic understanding of the anatomy of the brachial plexus. In every medical specialty, general medicine included, knowledge of key anatomic loci is crucial for patient care. Classic examples of this include placement of central venous lines or needle thoracentesis. In this case, the ulnar nerve, the end-terminal branch of the medial cord (posterior to the axillary artery) of the brachial plexus, is in jeopardy. Although the posterior cord is posterior to the axillary artery at lower levels, at this level the medial cord is interposed between the posterior cord and the artery. This is the so-called "region two of the axillary artery (posterior to the pectoralis minor muscle):" where the axillary block is performed.

**(Choice 1)** The axillary nerve is a branch of the posterior cord, but arises very high in the plexus and immediately exits the axilla via the teres muscle groups.

**(Choice 2)** The median nerve is formed from the medial and the lateral cords, is very low in the brachium, and is not in danger from an axillary block.

**(Choice 3)** The musculocutaneous nerve is a branch of the lateral cord and is in no danger, as it is buried in muscle tissue from its origin.

**(Choice 4)** The radial nerve, also a branch of the posterior cord, is in no danger of injury since it exits the axilla via the radial groove on the humerus, very deep to muscle. This nerve is most often injured during spiral fractures of the humerus.

179. Question

1 points

**Category: Surgery**

A 57-year-old man is returned to the post-surgical recovery unit after an open cholecystectomy. The patient had an uneventful, but prolonged, operative course in a very cold operating room. His past medical history is unremarkable. The only attempt at patient warming was raising the ambient temperature of the room. His urine output since arrival in the post-anesthesia care unit (PACU) has been 5 mL/hr. Which of the following is most likely to confirm the diagnosis?

1. ☐ Low serum aldosterone
2. ☐ Serum BUN to creatinine ratio greater than 20 ☐
3. ☐ Urine osmolality of 280 mOsm/kg
4. ☐ Urine sodium of 40 mEq/L
5. ☐ Urine specific gravity of less than 1.010

**INCORRECT** ☐

**The correct answer is 2.**

Post-surgical patients generally have moderate to severe derangement in fluid balance. They have been fasted before the procedure and then had a variety of sensible and insensible losses during the procedure. In this case, the idea of severe dehydration causing pre-renal azotemia would be supported by an elevated BUN and creatinine, but in a ratio of greater than 20: 1. This is due to the heightened reabsorption and retention of solute by the kidney that is reflected by the elevated BUN.

**(Choice 1)** is incorrect. In conditions of volume depletion, the renin-angiotensin-aldosterone axis is activated with high levels of each hormone. In this case, aldosterone is acting on the distal tubules to affect sodium reabsorption.

**(Choice 3)** is incorrect because in the case of volume depletion, the urine should be maximally or near maximally concentrated, reflecting retention of nearly all filtered water.

**(Choice 4)** is not correct. With volume depletion, the urine sodium should be quite low ( <20 mEq/L), reflecting retention of nearly all filtered water and sodium.

**(Choice 5)** is the opposite of what is expected. As with osmolality, this parameter should reflect maximal concentration of the urine, which is equivalent to minimal free water excretion.

180. Question

1 points

**Category: Surgery**

A 23-year-old man comes to the emergency department because of a painful swollen left knee. The pain began after he twisted his leg while playing football. Examination shows a swollen left knee with marked tenderness of the medial side of the knee. When compared to the right knee, on valgus stressing the left knee shows exaggerated laxity at the joint line. Which of the following is the most appropriate next step to confirm the diagnosis?

1. ☐ CT scan of the knee joint
2. ☐ Joint fluid aspiration
3. ☐ Arthroscopy
4. ☐ MRI of the knee joint ☐
5. ☐ Plain radiographs of the knee joint

**INCORRECT** ☐

**The correct answer is 4.**

This patient has an injury to medial collateral ligament of the knee. The medial collateral ligament is the most commonly injured ligament of the knee. Forceful abduction of the knee, often with a torsional component of motion causes most injuries to this ligament. On examination, the knee joint is swollen due to effusion with tenderness over medial aspect of the knee. Because the medial collateral ligament resists valgus angulations (abduction) at the knee, injury to this ligament leads to increased angulation of the effected knee on valgus stress. MRI is the investigation of choice for assessment of soft tissue injuries of the knee. MRI is able to detect complete and partial tears, the exact site of ligamentous injury and associated injuries to other ligaments or the meniscus.

**(Choice 1)** CT scan does not visualize the soft tissue of the knee joint (tendons, ligaments, and meniscus) as well as MRI.

**(Choice 2)** Swelling in this patient is due to effusion associated with ligamentous injury; fluid examination is not needed. Joint aspiration is useful in the diagnosis of septic arthritis and crystal-induced arthritis.

**(Choice 3)** Arthroscopy is an invasive procedure and is reserved for cases where MRI is inconclusive or surgical treatment of lesion is necessary.

**(Choice 5)** Plain radiographs are of limited use in confirming the diagnosis of ligamentous injury though they should be obtained for all patients with traumatic knee injury.

181. Question

1 points

**Category: Surgery**

An 18-year-old woman at 9 weeks' gestation is brought to the emergency department because of an open fracture of the tibia and fibula. She is hemodynamically stabilized and referred to the orthopedic department. She is scheduled for internal fixation of the tibia for the following day. However, before the surgery she develops severe dyspnea and confusion. Her temperature is 37.7 °C (99.9 °F), blood pressure is 110/70 mm Hg, pulse is 110/min, and respirations are 22/min. Examination shows numerous non-palpable petechiae in the upper part of the body. Which of the following is the most likely diagnosis?

1. ☐ Air embolism
2. ☐ Amniotic fluid embolism
3. ☐ Thromboembolism
4. ☐ Fat embolism ☒
5. ☐ Acute respiratory distress syndrome

**INCORRECT** ☐

**The correct answer is 4.**

This patient has a classic presentation of fat embolism. Fat embolism is common in patients with polytrauma, especially with multiple fractures of long bones. It is characterized by severe respiratory distress, petechial rash, subconjunctival hemorrhage, tachycardia, tachypnea, and fever. Diagnosis can be confirmed by presence of fat droplets in urine or presence of intra-arterial fat globules on fundoscopy. It may occur from 12 to 72 hours after the injury. Central nervous system dysfunction initially manifests as confusion and agitation but may progress to stupor, seizures, or coma and frequently is unresponsive to correction of hypoxia. Thrombocytopenia, anemia, and hypofibrinogenemia are nonspecific findings. Serial x-rays shows increasing diffuse bilateral pulmonary infiltrates within 24-48 hours of onset of clinical findings.

**(Choice 4)** Treatment should include prompt respiratory support. Use of heparin, steroids, and low molecular weight dextran is controversial.

**(Choice 1)** An air embolism can occur in a trauma patient who is on a respirator. It can also occur with subclavian vein access. It can result in sudden collapse and cardiac arrest.

**(Choice 2)** Amniotic fluid embolism occurs immediately after the rupture of membranes; it is not usually seen during this period of pregnancy.

**(Choice 3)** Thromboembolism can cause pulmonary embolism in bed-ridden patient; however it is rare at this young age. Also it would not cause the petechial rash. Such patients would have some signs of deep venous thrombosis or congenital thrombophilia.

**(Choice 5)** Acute respiratory distress is characterized by severe pulmonary distress. Again they do not have this classic rash.

182. Question

1 points

**Category: Surgery**

A 44-year-old unrestrained male driver is brought to the ER after a motor vehicle accident. Cervical spine is immobilized. His breathing is normal. At the scene of the accident, his blood pressure is 70/30 mm Hg. After receiving two liters of intravenous fluid, his blood pressure is 80/40 mm Hg. Neck veins are collapsed. Lungs are clear to auscultation. Abdomen is mildly distended. There is no obvious source of external bleeding. No intraperitoneal blood or solid organ damage is seen on ultrasonogram or diagnostic peritoneal lavage. Imaging studies reveal a pelvic fracture and fracture of the right fourth rib. Which of the following is the most appropriate next step in management?

1. ☐ Angiogram ☒
2. ☐ CT scan of the abdomen
3. ☐ CT scan of the chest
4. ☐ Laparotomy
5. ☐ Chest tube placement

**INCORRECT** ☐

**The correct answer is 1.**

This patient's history of motor vehicle accident and hypotension with no obvious source of external bleeding indicates possible internal bleeding. In hemodynamically unstable patients who have suffered blunt abdominal trauma and pelvic fracture, both intraperitoneal and retroperitoneal bleeding must be ruled out. This patient has already had an ultrasonogram and diagnostic peritoneal lavage performed to investigate his blunt abdominal trauma, both of which showed no intraperitoneal bleeding. The next investigation should be aimed at identifying any retroperitoneal bleeding caused by pelvic fractures. Not only does pelvic angiography provide the best means for identifying the source of retroperitoneal hemorrhage, but it can also be used to treat it. By embolizing the offending vessel, the bleeding can be stopped and the hemodynamics can be stabilized.

**(Choice 2)** A CT scan of the abdomen is the appropriate assessment for hemodynamically stable victims of blunt abdominal trauma and is contraindicated in unstable patients. This patient is hemodynamically unstable, and while a CT scan would identify the retroperitoneal bleeding, it would not help in treatment and would cost precious time.

**(Choice 3)** A CT scan of the chest would not be appropriate at this stage in the patient's management. His chest x-ray showed a fractured rib, but no pneumothorax, aortic dissection or other potential source for his hypotension. A CT scan of the chest would cost valuable time and not elucidate the source of hemodynamic instability.

**(Choice 4)** Laparotomy is the appropriate treatment for intraperitoneal bleeding confirmed on either ultrasound or diagnostic peritoneal lavage. However, pelvic angiography is the appropriate diagnostic and therapeutic option for retroperitoneal hemorrhage associated with pelvic fracture.

**(Choice 5)** Chest tube placement would be appropriate for managing a pneumothorax. This patient's chest x-ray did not reveal pneumothorax.

183. Question

1 points

**Category: Surgery**

A young mother left her 3-year-old daughter alone in the kitchen while she answered the phone in an adjacent room. In the few minutes, she was out of the room the child grabbed a hot frying pan sitting on the stove. The child started to wail and run in a circle waving her hand; the mother panicked, smeared butter on the burned hand, and rushed the child to a nearby walk-in clinic. The physician in attendance examined the child and found that the child's thumb, index finger, and the palm of her right hand were red. There was also a 0.5 X 0.25 in (1.27 X 0.64 cm) blister at the base of her thumb and a smaller one on the tip of her index finger. No other injury could be ascertained. Which of the following is the most appropriate first course of action?

- ☐ 1. Cool the burn site by immediately immersing the hand in ice-cold water.



2. ☐ Clean the area and dress it with gauze. ☐
3. ☐ Aspirate the fluid underneath the blister.
4. ☐ Débride the wound, aspirate the fluid, and apply an antibiotic cream.
5. ☐ Provide tetanus prophylaxis.

**INCORRECT** ☐

**The correct answer is 2.**

This child suffered first and second-degree burns on her hand and fingers. The first-degree burns are indicated by the reddened area, second-degree burns by the blisters. The primary treatment should be gently cleaning the burned area with a cool, not cold, antiseptic solution, applying a topical antibiotic, and dressing the injured area with a nonadherent dressing. Following that, a conforming protective material should be applied. The mother suffered from shock at seeing her child suffer and guilt at leaving her unattended and needs to be reassured that, luckily, the child's burns are minor and should heal without scarring in the course of a couple of weeks. She should also be informed that application of butter or any other greasy substance is not suitable treatment because it traps the heat of the burn, possibly making it worse. She ought to also be advised that a better course of action in the event of any serious accident is to call 911 rather than rush off to a walk-in clinic.

**(Choice 1)** introduces a risk of compromising circulation to marginally surviving areas of the burn and should not be done for any burn more serious than a first-degree one. In addition, for burns covering an extensive area such cooling also creates a risk of hypothermia. On the other hand, washing relatively nonextensive first or second-degree burns with cool water, about 60-80°F (15-25°C), eases the pain.

**(Choices 3 & 4)** Most authorities believe the blister should be left intact as long as possible because the skin of a blister may act as a natural dressing, protecting the wound against infection and reducing the amount of pain; consequently, (aspirate the fluid underneath the blister) and (débride the wound, aspirate the fluid, and apply an antibiotic cream) are incorrect. In addition to cooling to reduce pain, an oral analgesia such as acetaminophen (not aspirin) should be provided.

**(Choice 5)** is important in all patients with burns in whom the skin is or may be broken. Thus, if this child's tetanus immunization is not up to date, it should be brought up to date. The best course of action in this particular case would be to contact and inform the child's regular physician of the accident and treatment, to determine the child's immunization status, and to arrange for a follow-up appointment either at the walk-in clinic or better yet with the child's usual physician. In any case, the child should be seen again within 48 hours to make sure that there is no secondary infection.

A 55-year-old man comes to the emergency department because of severe right-sided chest pain. His temperature is 37.8 °C (100.4 °F), blood pressure is 138/88 mm Hg, pulse is 88/min and respirations are 19/min and shallow. Examination shows decreased respiratory movements on the right side of the chest and tenderness on palpation over the right mid-chest. An x-ray film of the chest shows a fracture of the right 6th rib. Which of the following is the most important goal in management of the rib fracture in this patient?

1. ☐ To achieve a tidal volume of 500 ml with intubation
2. ☐ To use only intravenous colloids
3. ☐ To ensure appropriate analgesia ☒
4. ☐ To provide mechanical stabilization to the chest wall
5. ☐ To give prophylactic antibiotics

**INCORRECT** ☐

**The correct answer is 3.**

Rib fractures should be suspected in all patients with localized chest wall tenderness following trauma; up to half of rib fractures will not be evident on initial chest x-ray. Rib fracture is associated with significant pain, which causes hypoventilation that may ultimately result in atelectasis and pneumonia. Thus, pain management and respiratory support are the priorities in the management of rib fractures. Oral agents, such as opiates and/or NSAIDs are most commonly utilized, but an intercostal nerve block with a long-acting local anesthetic can be used if oral or systemic analgesics are not sufficiently effective. Intercostal nerve blocks provide pain relief without affecting respiratory function, as opiate analgesics may, but it does carry some risk of pneumothorax.

**(Choice 1)** The cause of hypoventilation in patients with rib fracture is severe pain. Pain relief will correct the hypoventilation and intubation is not needed unless respiratory decompensation occurs.

**(Choice 2)** Use of colloids or crystalloid has no role in management of rib fracture unless the patient has hypotension or blood loss.

**(Choice 4)** Mechanical stabilization of chest wall is not required in rib fractures. In fact, the external compression caused by such devices may further impair adequate ventilation.

**(Choice 5)** Prophylactic antibiotics are not indicated routinely in management of rib fracture unless an open fracture has occurred.

A 49-year-old obese man presents to his primary care physician for a follow-up examination. He has a history of uncontrolled diabetes mellitus and bipolar disorder. His current medications include lithium and milk of magnesium. Physical examination of the heart, lungs, and abdomen are within normal limits. Laboratory studies reveal serum calcium of 14 mg/dL. What is the most likely explanation for these findings?

1. ☐ Dietary indiscretion
2. ☐ Medication overdose
3. ☐ Milk-alkali syndrome
4. ☐ Parathyroid adenoma
5. ☐ Parathyroid hyperplasia ☐

**INCORRECT** ☐

**The correct answer is 5.**

Renal failure is the most common cause of secondary hyperparathyroidism. This patient, who has had severe uncontrolled diabetes and lab values consistent in patients with diabetes, is most likely to have renal failure as the cause of his hypercalcemia. Whenever the kidney loses its ability to reabsorb calcium and hydroxylate vitamin D for calcium absorption from the gut, hypocalcemia triggers the parathyroid glands to increase their production of parathyroid hormone. Milk-alkali syndrome can cause hypercalcemia in patients who eat many antacids or drink an excessive amount of milk. This condition is more commonly found in patients who have gastric ulcers and frequently depend on milk and antacids for relief. Lithium can cause hypercalcemia by causing hyperparathyroidism. Parathyroid adenomas can cause hypercalcemia by increasing parathyroid hormone secretion.

186. Question

1 points

**Category: Surgery**

A 60-year-old male with a history of ischemic heart disease (IHD) is brought to the emergency department after a motor vehicle accident. On arrival, his blood pressure is 90/60 mm Hg, pulse is 110/min and respirations are 26/min. There are bruises on the left thigh, left side of the chest and tenderness over the same areas. He is started on intravenous normal saline. The presence of which of the following situations would require a blood transfusion in this patient?

1. ☐ Hematocrit less than 35%
2. ☐ Blood loss greater than 1500 ml ☐

- 3. ☐ Evidence of hypoxia
- 4. ☐ Lactic acidosis
- 5. ☐ Fracture of femur
- 6. ☐ Decreased urine output

**INCORRECT** ☐

**The correct answer is 2.**

Acute blood loss is an indication for transfusion in patients who have lost 25-30% of their blood volume (1500ml in 70 kg man). Crystalloid resuscitation is generally adequate for blood loss that is less than 25% of the patient's blood volume though patients with concomitant heart disease and other comorbidities may require transfusion with lesser blood losses. An effective general guideline for treating a bleeding patient is to initially resuscitate with crystalloids. 2L are administered very quickly. If the patient continues to show signs of hemodynamic instability after infusion of 2L of crystalloid, blood transfusion should be initiated.

**(Choice 1)** The hematocrit is not a good indicator in acute blood loss because acute blood loss results in a proportional loss of both erythrocytes and plasma. Acutely, physiologic responses to depletion of intravascular volume, such as increased renal retention of water, have not had an opportunity to dilute the blood and cause a drop in hematocrit.

**(Choice 3)** Hypoxia in a trauma patient could be due to pneumothorax, hemothorax, cardiac tamponade, pulmonary contusion etc. Hypoxia alone is not an indication for blood transfusion.

**(Choices 4 & 6)** Acidosis in trauma patients is most likely due to inadequate tissue perfusion. This could be from any reason and need not be from blood loss. For example cardiac tamponade or pneumothorax can cause hypotension and resultant lactic acidosis. Decreased urine output is to the result of inadequate renal perfusion, which may be corrected in many patients with crystalloids alone.

**(Choice 5)** Even though a femoral fracture may be associated with a potential hemorrhage, the presence of a fracture alone is not an indication for blood transfusion.

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187. Question

1 points

**Category: Surgery**

A 51-year-old man is undergoing abdominal surgery and becomes hypotensive while under general anesthesia. The patient had been doing well during most of the procedure but now has a blood pressure of 80/40 mm Hg. His past medical history is significant for coronary artery disease and diabetes mellitus. A pulmonary artery catheter placed prior to the procedure gives the following data:

**Central venous pressure:** 10 mm Hg

**Pulmonary artery pressure:** 60/30mmHg

**Pulmonary capillary occlusion pressure:** 24mmHg

**Cardiac output:** 2.3 L/min

Which of the following is the most likely diagnosis?

1. ☐ Acute left heart failure ☐
2. ☐ Acute mitral regurgitation
3. ☐ Acute right heart failure
4. ☐ Hypoxic pulmonary vasoconstriction
5. ☐ Sepsis syndrome

**INCORRECT** ☐

**The correct answer is 1.**

Pulmonary artery (Swan Ganz) catheters are ubiquitous in critical care settings; a basic ability to interpret data from them is vital to the practice of inpatient hospital medicine. This patient has a low cardiac output and a high filling pressure ( > 18 mm Hg) and is hypotensive. Therefore, this patient's shock syndrome is cardiogenic. Cardiogenic shock is caused by a number of underlying problems, but the end result is left ventricular failure. This also accounts for the secondarily high right-sided pressures and filling pressures (left heart failure causes right heart failure).

**(Choice 2)** is a possibility in this case. At first glance, acute MR could account for all of the patient's findings, both on physical examination and pulmonary artery catheter. However, unless the acute MR occurred in the setting of acute ischemia, there is no way to account for the severely depressed cardiac output (LV function). Therefore, isolated acute MR from a papillary muscle rupture or chordae rupture could not alone account for all of this patient's findings.

**(Choice 3)** is incorrect because it fails to explain the elevated left-sided filling pressures.

**(Choice 4)** would acutely produce elevated pulmonary artery pressures and possibly right heart failure over the long term, but not in an acute manner.

**(Choice 5)** is defined as hyperdynamic cardiac output (supraphysiologic) with systemic hypotension. This patient has a depressed output, not compatible with sepsis.

A 56-year-old alcoholic man with chronic pancreatitis has recurrent attacks of abdominal pain that radiates into his back. The pain is controlled with medical therapy. He has lost 30 lb (13.6 kg) in the past 3 months because of chronic diarrhea. Examination of the abdomen reveals no masses. Computerized tomography (CT) of the pancreas reveals multiple calcifications but no mass lesions. The serum glucose value is normal. A qualitative stool test for fat is positive. Antigliadin antibodies are not present. Which of the following would be the most appropriate treatment?

1. ☐ Total pancreatectomy
2. ☐ Broad-spectrum antibiotic therapy
3. ☐ Gluten-free diet
4. ☐ Oral pancreatic enzymes before, during, and after meals ☐
5. ☐ Administration of lactulose

**INCORRECT** ☐

**The correct answer is 4.**

Chronic pancreatitis produces steatorrhea (increased fat in the stool) because the intestine is lipase deficient. Consequently, undigested lipid and fat-soluble vitamins are lost in the stool. Oral pancreatic enzyme preparations have high lipase activity; thus, administration before, during, and after a meal, will help hydrolyze ingested fats, thereby facilitating their absorption. Concurrent administration of a histamine ( $H_2$ ) antagonist will assist this process by blocking inactivation of the enzyme by acid. In addition, the patient should be on a low-fat diet.

**(Choice 1)** is a treatment option in chronic pancreatitis if intractable pain is present and is not amenable to medical therapy. However, normally the patient's pain is controlled with medical therapy. A

**(Choice 2)** does not enhance lipid absorption because bacterial overgrowth is not part of the pathophysiology of chronic pancreatitis. Bacterial overgrowth produces bile salt deficiency, which leads to steatorrhea.

**(Choice 3)** is the therapy of choice for celiac disease, which is an autoimmune disease that has antibodies directed against the gliadin fraction in gluten. These antibodies are not present in the patient.

**(Choice 5)** is a synthetic sugar used to treat constipation and to lower blood ammonia levels resulting from hepatic encephalopathy; it has no role in the treatment of steatorrhea.



A 35-year-old man is brought to the emergency department after suffering a deep laceration from a rusted piece of barbed wire that was hidden in the grass. Examination shows a 6 cm laceration on the lateral leg that is contaminated with dirt and soil. The laceration is bleeding. The patient reports having received a complete set of childhood vaccinations. His last tetanus immunization was at age 23. Which of the following is the most appropriate next step in the management of this patient?

1. ☐ Clean the wound, no need for vaccination
2. ☐ Administer tetanus toxoid ☐
3. ☐ Administer tetanus immunoglobulin
4. ☐ Administer tetanus toxoid and immunoglobulin

**INCORRECT** ☐

**The correct answer is 2.**

All patients with traumatic wounds should be considered for tetanus immunoglobulin (TIG) or tetanus toxoid (TT) administration. Tetanus immunoglobulin provides passive, temporary and immediate immunity and tetanus toxoid provides active, prolonged but delayed immunity. The current recommendations are as follows:

History of tetanus toxoid immunization	Clean minor wounds	High-risk wounds
< 3 doses	TT: Yes TIG: No	TT: Yes TIG Yes
≥ 3 doses	TT: Yes if last dose >10 years ago TIG: No	TT: Yes if last dose > 5 years ago TIG: No

Wounds at high risk for vegetative *Clostridium tetani* growth are those that provide an anaerobic environment for growth, such as puncture wounds, projectile wounds, wounds containing foreign bodies, sites of active infection by other organisms, and wounds containing necrotic tissue. The patient described in the vignette needs tetanus toxoid only, as he has already received at least 3 doses of the tetanus vaccine with his childhood vaccine series.

**(Choice 1)** This patient requires a booster (toxoid) vaccination as it has been more than 10 years since his last vaccination.

**(Choices 3 & 4)** Tetanus immunoglobulin is indicated in patients who have wounds suspicious for *C. tetani* contamination and who have had less than 3 vaccinations. Additionally, TIG is used in the treatment of symptomatic tetanus disease in an effort to eliminate any unbound toxin.

**Category: Surgery**

A 67-year-old woman presents to her doctor's office with a history of sudden severe backache. The patient states that she was working in the garden and tried to lift a sack of fertilizer when her "back gave out." She states that the pain was very intense, was stabbing in nature, and went across her abdomen, like a belt. She has a history of hypertension and diabetes mellitus and some urinary problems. Her vital signs are as follows: blood pressure, 130/100 mm Hg; pulse, 86/min, regular; respirations, 18/min; and temperature, 37°C (98.6°F). Physical examination reveals tenderness to deep palpation in the lower thoracic spine, paraspinal spasm, and a restricted straight-leg raise on both lower extremities. The deep tendon reflexes are normal in the knees, but are absent in both ankles. There are a few beats of clonus that were not sustained. She also has decreased touch in both legs below the knees. The most likely diagnosis is which of the following?

1. ☐ Spinal cord tumor
2. ☐ Epidural abscess
3. ☐ Fractured vertebra
4. ☐ Posterolateral lumbar disk herniation
5. ☐ Central lumbar disk herniation ☐

**INCORRECT** ☐

**The correct answer is 5.**

This patient has developed a compression fracture of the vertebra. She probably has osteoporosis, which makes it possible for a compression fracture to occur. Sudden onset of pain that radiates to the front of the abdomen like a belt is a characteristic presentation. This, together with tenderness in the vertebra to palpation, should suggest the diagnosis. Additional features include neurologic deficits secondary to spinal cord compression. The sensory deficits in the legs of this patient and the absent ankle jerks are due to diabetic neuropathy.

**(Choice 1)** is usually associated with chronic pain, and there may be tenderness on palpation of the vertebra. Clonus has to be sustained to be pathologic and signifies involvement of the corticospinal pathway. Thus, there are no neurologic findings in this patient to support a spinal cord tumor.

**(Choice 2)** can present with pain over a few days and tenderness in the spine, together with pyrexia, which is absent in this patient. Furthermore, the patient may have neurologic deficits as well.

**(Choice 4)** is associated with radicular pain (i.e., pain going down one lower extremity) together with sensory loss over the distribution of the appropriate dermatome in the leg. There may be motor weakness, either weak dorsiflexion or weak plantar flexion of the appropriate foot, depending on which nerve root is involved. No spinal tenderness will be elicited.

**(Choice 5)** is associated with saddle anesthesia and an absent or weakened anal wink reflex, or weakness of the lower extremity with partial saddle anesthesia. The former is due to involvement of the conus medullaris, whereas the latter is due to involvement of the cauda equina. In neither case will there be tenderness of the vertebral spine.

191. Question

1 points

**Category: Surgery**

A 27-year-old basketball player jumps to block a shot with his right hand. As his hand contacts the ball, he feels severe pain in his right shoulder. He presents to the emergency department with continuing shoulder pain. You note that he holds his right arm in slight external rotation, supporting its weight with his left hand. On physical examination, he resists internal rotation of his right arm. Which of the following nerves is most likely to be injured in this patient?

1. ☐ Radial
2. ☐ Ulnar
3. ☐ Musculocutaneous
4. ☐ Axillary ☐
5. ☐ Long thoracic

**INCORRECT** ☐

**The correct answer is 4.**

In blocking his opponent's shot, this athlete has sustained forceful abduction and external rotation of his right arm, resulting in anterior dislocation of the humeral head from the glenoid fossa. In anterior shoulder dislocations, the humeral head is displaced anteriorly relative to the glenoid fossa and the anterior capsule of the glenohumeral joint is often torn. Physical exam will reveal prominence of the acromion with an abnormal subacromial space where the humeral head normally resides. Fullness of the anterior shoulder is noted on palpation. Anterior shoulder dislocations warrant neurologic examination of axillary nerve function, as the axillary nerve courses around the medial undersurface of the humeral head through the quadrangular space and can be injured by anteroinferior shoulder dislocations. Axillary nerve injury can cause paralysis of the deltoid and teres minor muscles as well as loss of sensation over the lateral upper arm.

**(Choice 1)** Classic causes of radial nerve injury include fracture of the humeral midshaft and use of improperly fitted crutches. Symptoms include wrist drop and sensory loss on the posterior arm, forearm, and lateral dorsal hand.

**(Choice 2)** The ulnar nerve may be injured by fracture of the medial epicondyle of the humerus or more distally by deep lacerations of the anterior wrist. Symptoms include “claw hand” resulting from paralysis of most of the intrinsic muscles of the hand as well as sensory loss on the dorsal and ventral lateral hand.

**(Choice 3)** The musculocutaneous nerve arises from the lateral cord of the brachial plexus and innervates the biceps, brachialis and coracobrachialis muscles. It is not frequently injured by common forms of upper extremity trauma.

**(Choice 5)** The long thoracic nerve innervates the serratus anterior muscle. Deep lacerations to the axillary region and axillary lymphadenectomy are common causes of long thoracic nerve injury. Damage causes scapular winging.

## 192. Question

1 points

### Category: Surgery

During her visit to a primary care physician, a 39 year-old woman relates that she has recently had bouts of hoarseness often associated with difficulty in swallowing and breathing. Upon taking a history, the physician also determines that she immigrated with her parents from the Ukraine in 1988 at the age of 17 years, married a 40-year-old Australian citizen a year ago, and gave birth to her first child 8 months ago. Upon examination, the physician discovers a firm nodule near her Adam's apple. The next step in obtaining a diagnosis is which of the following?

1. ☐ Analyzing the results of an ultrasound scan
2. ☐ Doing a fine needle aspiration biopsy ☒
3. ☐ A thyroid nuclear scan using  $^{123}\text{I}$
4. ☐ Determining the serum thyroid level
5. ☐ A formal surgical biopsy

**INCORRECT** ☐

**The correct answer is 2.**

Although several procedures provide clues concerning whether a thyroid nodule is benign or cancerous, a definitive answer requires a biopsy and histological analysis by a pathologist; thyroid fine needle aspiration (FNA) biopsy is a nonsurgical method that usually can definitely differentiate between benign and malignant nodules. Consequently, it commonly is the first and only test used to evaluate the potential malignancy of a nodule. Performing a successful fine needle aspiration biopsy early in the workup of a nodule typically provides a rapid and unambiguous diagnosis, thus reducing cost and saving the patient anxiety. That she immigrated from the Ukraine is relevant because of the accident at Chernobyl.

**(Choices 1 & 3)** Analyzing the results of an ultrasound scan and/or a thyroid nuclear scan using  $^{123}\text{I}$  are generally reserved for the approximately 5% of fine needle aspiration biopsies that are reported to be nondiagnostic or the approximately 10% of results categorized as suspicious. A report of nondiagnostic biopsy generally results from an inability to obtain a sufficient number of thyroid cells using FNA, whereas about 75% of the nodules identified as suspicious are benign follicular adenomas that cannot be distinguished from follicular or Hürthle cell cancers. A solid or complex ultrasound scan result implies that the nodule is malignant, and a cold area after a thyroid scan (i.e., where  $^{123}\text{I}$  is not taken up) indicates possible malignancy since about 95% of hot nodules are benign. Consequently, a cold nodule found suspicious by FNA is generally removed surgically. In addition to being an aid in diagnosis, an ultrasound scan is also carried out to help in the placement of the needle while performing FNA.

**(Choice 4)** is generally an early test done to obtain an overview of the patient's thyroid function, but it is not able to diagnose the potential malignancy of a nodule.

**(Choice 5)** is reserved for the diagnosis of nodules labeled non-diagnosable or suspicious after FNA.

### 193. Question

1 points

#### Category: Surgery

A 77-year-old obese male with a known AAA is brought to the ER with sudden, severe abdominal pain, which radiates to his back. The patient is on diuretics for hypertension and oral medication for adult-onset diabetes. Vital signs are HR 125 and BP 88/57. The patient's abdomen is distended and mildly tender. What is the best initial management for this patient?

1. ☐ Vigorous fluid resuscitation, ICU admission for stabilization prior to operative repair
2. ☐ Paracentesis to evaluate for possible ruptured AAA
3. ☐ Emergent surgical exploration ☒
4. ☐ Abdomen/pelvic CT scan to evaluate the AAA prior to repair
5. ☐ Emergency angiogram to confirm a ruptured AAA diagnosis

**INCORRECT** ☐

**The correct answer is 3.**

Survival after ruptured AAA is dependent on rapid diagnosis and immediate surgical exploration for repair. A ruptured AAA carries a 90% overall mortality rate, which can be reduced to 50% for patients who reach a hospital that is capable of providing appropriate

care via immediate exploration and repair. Figure 5-180 is an abdominal CT showing a rim of calcium at the borders of the AAA and surrounding retroperitoneal hematoma from rupture (note the arrow).

**(Choice 1)** While fluid resuscitation for hypovolemic shock is needed, once the diagnosis of AAA rupture is made, surgical exploration and repair should not be delayed for attempts at stabilization.

**(Choice 2)** An acute AAA rupture, as described in this case, usually consists of a rupture with the surrounding hematoma contained within the retroperitoneum. Paracentesis in an effort to find evidence of rupture would therefore be fruitless and needlessly delay the proper surgical treatment.

**(Choice 4)** The CT scan is an excellent diagnostic tool for evaluating patients suspected of having an AAA. However, in the setting of suspected ruptured AAA, obtaining a CT scan would merely delay the move to immediate surgical care.

**(Choice 5)** While abdominal angiography is a test for work-up of some aortic aneurysms, it should not be used to confirm a ruptured AAA. Time wasted in obtaining the study could potentially be lethal due to delay in definitive surgical care.

#### 194. Question

1 points

##### Category: Surgery

A 12-year-old boy is brought to the emergency department after falling from a tree. Examination shows tenderness and swelling over the left lower arm. An x-ray film of the arm shows a fracture of the distal end of the humerus with proximal and posterior displacement of the distal fracture segment. Closed reduction of the fracture is performed. However, postoperatively the patient complains of increasing pain in the left arm and forearm. Twelve hours postoperatively his forearm is pale and cold. There is marked pain on passive extension of the fingers. Which of the following is the potential dreaded complication of this condition?

1. ☐ Malunion with alteration of carrying angle
2. ☐ Non-union
3. ☐ Reflex sympathetic dystrophy
4. ☐ Sudeck's atrophy
5. ☐ Volkmann ischemic contracture ☐

**INCORRECT** ☐

**The correct answer is 5.**

This patient is experiencing acute compartment syndrome secondary to supracondylar fracture of humerus. Supracondylar fracture of humerus is common in young children and



adolescents secondary to fall on an outstretched hand. Compartment syndrome results from increased pressure within a limited anatomic space, acutely compromising the circulation and ultimately threatening the function of the tissue within that space. Diagnosis of compartment syndrome is made predominantly on clinical findings of pain, pallor, pulselessness, paralysis and paresthesia. Treatment consists of immediate fasciotomy. Volkmann's ischemic contracture is the final sequel of compartment syndrome in which the dead muscle has been replaced with fibrous tissue.

**(Choice 1)** Malunion with alteration of carrying angle is another common complication of supracondylar fracture of humerus; however it is not a sequel of compartment syndrome.

**(Choice 2)** Non-union is not a common complication of supracondylar fracture of humerus and does not occur as a sequel of acute compartment syndrome.

### 195. Question

1 points

#### Category: Surgery

A 45-year-old woman underwent elective surgery for an inguinal hernia. In the postoperative recovery room, she developed nausea, vomiting, and acute abdominal pain. She has a history of systemic lupus erythematosus, pernicious anemia, type-1 diabetes, chronic low back pain, and uterine fibroids. Her preoperative medications include monthly vitamin B<sub>12</sub> injections, insulin, prednisone, hydroxychloroquine, and acetaminophen. Her blood pressure is 70/40 mm Hg and heart rate is 110/min. Initial laboratory studies show a blood glucose of 50 mg/dl. Which of the following is the most likely cause of her condition?

1. ☐ Postoperative bleeding
2. ☐ Diabetic ketoacidosis
3. ☐ Intra-abdominal abscess
4. ☐ Intestinal obstruction
5. ☐ Adrenal insufficiency ☐

**INCORRECT** ☐

**The correct answer is 5.**

The clinical scenario described is suggestive of acute adrenal insufficiency. Acute onset of nausea, vomiting, abdominal pain, hypoglycemia, and hypotension after a stressful event (e.g., surgical procedure) in a patient who is steroid-dependent is typical. A very important clue to the correct diagnosis in this patient is the past medical history (lupus) indicative of preoperative steroid use. Exogenous steroids depress pituitary-adrenal axis and a stressful situation can precipitate an acute adrenal insufficiency.

**(Choice 2)** Diabetic ketoacidosis is also manifested by nausea, vomiting, and abdominal pain; however, you will see hyperglycemia, and you usually do not see hypotension.

**(Choice 3)** An abscess is a late postoperative complication.

**(Choice 4)** Intestinal obstruction is not accompanied by hypoglycemia and hypotension, even though you can see all the rest.

196. Question

1 points

**Category: Surgery**

A 72-year-old man underwent bypass grafting for severe coronary artery disease. On the 1st postoperative day, his temperature is 36.6 °C (97.9 °F), blood pressure is 120/70 mm Hg, pulse is 80/min and respirations are 12/min. On postoperative day 10 he is complaining of worsening retrosternal pain despite continuing analgesia with morphine. He also has dyspnea at rest. His temperature currently is 37.9 °C (100.1 °F), blood pressure is 110/70 mm Hg, pulse is 100/min and respirations are 24/min. Examination shows clear heart sounds without murmurs or rubs. EKG shows no acute changes compared to the EKG on the 1st postoperative day. An x-ray film of the chest shows widening of the mediastinum. Echocardiography shows a small amount of pericardial fluid. Laboratory studies show:

**Hemoglobin:** 11.0 g/L

**Platelets:** 120,000/mm<sup>3</sup>

**Leukocyte count:** 16,500/mm<sup>3</sup>

**Neutrophils:** 86%

**Lymphocytes:** 13%

**Prothrombin time:** 12 sec

**Partial thromboplastin time:** 30sec

Which of the following will this patient most likely require?

1. ☐ Aspirin therapy
2. ☐ Thoracotomy for debridement and drainage; antibiotic therapy ☒
3. ☐ Thoracotomy for hemostasis
4. ☐ Pericardial puncture and aspirin therapy
5. ☐ Antibiotic therapy alone

**INCORRECT** ☐

**The correct answer is 2.**

The differential diagnosis of a widened mediastinum as a solitary finding includes processes as diverse as anthrax, various tumors, mediastinitis, aortic dissection, hemorrhage and large

pericardial effusion among others. Because this patient has just undergone a surgical procedure involving the mediastinum and has laboratory and clinical findings suggestive of an infection, acute mediastinitis is the most likely diagnosis. Mediastinitis complicates up to 5% of sternotomies. Like an abscess, the treatment of mediastinitis requires drainage, debridement and antibiotic therapy. One in five patients with acute mediastinitis will not survive despite treatment.

**(Choices 1 & 4)** Fever, leukocytosis, tachycardia and chest pain might be the signs of postpericardiotomy syndrome. This syndrome is autoimmune in nature and classically occurs a few weeks following any procedure where the pericardium is incised. Treatment is with pericardial puncture if tamponade occurs, and with aspirin or corticosteroids to address the inflammation.

**(Choice 3)** Postoperative mediastinal hemorrhage is less likely to become symptomatic on the 10th day; most hematomas occur within the first 48 hours of a procedure. Moreover hemorrhage would not likely cause fever and leukocytosis.

**(Choice 5)** Antibiotic therapy alone is not sufficient for this disease.

## 197. Question

1 points

### Category: Surgery

A 32-year-old male comes to the emergency department because of a 3 day history of increasing lower abdominal pain, mild diarrhea and rectal pain on defecation. Ten days ago he had right lower quadrant (RLQ) pain for about 24 hours that resolved spontaneously. Since then, he has had malaise and low-grade fever. His temperature is 38.7 °C (101.6 °F), blood pressure is 150/90 mm Hg, pulse is 110/min and respirations are 15/min. Examination shows lower abdominal tenderness without rebound. No masses are palpable, and bowel sounds are decreased. Rectal examination shows a very tender, boggy and fluctuant bulging on palpation with the tip of the finger anteriorly. Laboratory studies show:

### Complete blood count

Hemoglobin: 14.0 g/L

Platelets: 270,000/mm<sup>3</sup>

Leukocyte count: 15,500/mm<sup>3</sup>

His current condition is most likely a complication of?

1. ☐ Anorectal abscess
2. ☐ Invasive diarrhea
3. ☐ Acute appendicitis ☐
4. ☐ Acute diverticulitis
5. ☐ Colon cancer

**INCORRECT** ☐

**The correct answer is 3.**

The patient described most likely suffered appendicitis during the 24-hour period where he felt abdominal pain 10 days prior to admission. Subsequent rupture of the inflamed appendix in this case led to formation of a pelvic abscess due to drainage of fluid into the dependent rectovesical pouch. In males, appendicitis is a common cause of pelvic abscess while gynecologic issues more commonly cause pelvic abscess in females. The finding of a tender, fluctuant mass palpable only with the tip of the examining finger on rectal examination indicates an abscess in the rectovesical pouch as the prostate is much more readily palpable and would cause different symptoms. Patients with pelvic abscesses typically present with fever, leukocytosis, painful defecation and diarrhea resulting from bowel irritation by the intraabdominal infection. Drainage of the abscess is the usual treatment in such cases.

**(Choice 1)** Anorectal abscesses cause perineal pain with a fluctuant mass palpable on the perineum. Pain with ambulation and defecation is common as well as urinary retention.

**(Choice 2)** Invasive diarrhea would not cause a fluctuant swelling on rectal exam and the patient would most likely have generalized abdominal pain, tenesmus and bloody diarrhea.

**(Choices 4 & 5)** Colon cancer and diverticulitis can be complicated by pelvic abscess, but these disease processes are less likely in this age group. Additionally, diverticulitis would most classically cause left lower quadrant pain rather than right lower quadrant pain.

198. Question

1 points

**Category: Surgery**

A 12-year-old male is seen in the ED after being hit by a car. His only injury is a left closed tibia/fibula fracture. The orthopedic surgeon on call takes the patient to the operating room and performs an open reduction with internal fixation. Later that night the patient complains of increasing left leg pain, unrelieved with morphine. After the dressings are removed, a tight left lower leg is noted. The dorsal pedal pulse is palpable, but the patient is unable to move his toes and cries out in pain upon passive dorsal flexion. What is the most appropriate next step?

1. ☐ Four-compartment fasciotomies ☐
2. ☐ A different narcotic
3. ☐ Surgical embolectomy
4. ☐ Duplex Doppler scan
5. ☐ Nothing, as long as you can feel pulses

**INCORRECT** ☐

**The correct answer is 1.**

This case is a classic example of lower extremity compartment syndrome. Patients are at risk when reperfusion follows an extended period of ischemia. Early signs of compartment syndrome include pain out of proportion to exam, decreased sensation in the first web space, and increased pain with passive dorsiflexion of the foot. The diagnosis can be confirmed by measurement of compartment pressures; any value higher than 30 mm Hg is considered diagnostic. Patients with compartment syndrome may not lose peripheral pulses, as the pressures would have to be elevated above systolic arterial pressure to compromise arterial perfusion. Emergent four-compartment fasciotomies is the appropriate treatment.

**(Choice 2)** Inadequate pain control is not the issue in this patient. The pain associated with compartment syndrome is significant, and trying a different narcotic will not resolve the problem.

**(Choice 3)** There is no evidence of thrombosis formation in this case.

**(Choice 4)** A duplex Doppler scan would show evidence of arterial flow but would miss the problem of decreased tissue perfusion.

**(Choice 5)** Pulses may be palpable despite the presence of compartment syndrome.

199. Question

1 points

**Category: Surgery**

A 72-year-old female is seen in the emergency department with a history of sudden, severe, colicky midabdominal pain and nausea and vomiting over the past 3 hours. During the examination, she throws up a bile-stained vomitus. Physical examination reveals generalized abdominal tenderness with diminished bowel sounds. Radiography of the abdomen shows a radiopaque mass in the distal small bowel on the right side, with dilated loops proximally. No free air is noted under the diaphragm, but air is present in the biliary tree. Which of the following is the most likely diagnosis?

1. ☐ Lymphoma of the small bowel
2. ☐ Acute pancreatitis
3. ☐ Acute appendicitis with radiopaque fecalith
4. ☐ Gallstone ileus ☐
5. ☐ Intussusception

**INCORRECT** ☐

**The correct answer is 4.**

This patient has a mechanical obstruction of the bowel caused by a large gallstone (>2.5 cm) lodged within the lumen of the ileus: i.e., gallstone ileus. These stones are usually radiopaque. Gallstone ileus is most commonly seen in elderly women who have a chronically inflamed gallbladder that adheres to the bowel. This results in a cholecystenteric fistula, which connects the gallbladder with either the duodenum or hepatic flexure of the colon, both of which are in the vicinity of the gallbladder. In 40% of cases, air is seen in the biliary tree because bowel air is transported to that location via the fistula. Emergency laparotomy and enterotomy to remove the stone should be undertaken. A second stone may be present proximally and should be removed to avoid recurrence. The fistula should be left alone, because it is not the cause of this patient's symptoms, and it closes off by itself.

Cholecystectomy might be undertaken at a later date, if the patient has symptoms.

**(Choice 1)** Tumors of the small bowel (e.g., lymphoma of the small bowel) are rare. The most common location is the terminal ileum, and they are not radiopaque. Lymphoma is the most common primary malignant tumor of the small intestine. It may present with rectal bleeding or intussusception.

**(Choice 2)** presents as an acute abdomen, but it is not associated with a radiopaque mass in the small bowel. It is more common in males and in a younger age group. A plain abdominal x-ray film shows a sentinel loop, which represents a dilated proximal loop of jejunum adjoining the pancreas.

**(Choice 3)** Acute appendicitis with radiopaque fecalith has a different clinical presentation. The patient would complain of nausea, vomiting, constipation, and periumbilical pain that radiates and settles in the right lower quadrant. Physical examination would elicit tenderness and guarding in the right lower quadrant. Finally, fecaliths are not radiopaque.

**(Choice 5)** is a telescoping of a segment of the bowel into the adjacent segment. This usually involves the terminal ileum telescoping into the proximal large bowel. It is the most common cause of intestinal obstruction in children. It is associated with a sausage-shaped mass in the mid-abdomen and red, currant-jelly stool. If it cannot be reduced by barium enema, Surgery is required.

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200. Question

1 points

**Category: Surgery**

A 50-year-old man presents to the emergency department complaining of two days of abdominal pain. He describes the pain as shifting and periodic, coming and going in waves. He has vomited three times over the last several hours, but has not passed a bowel movement for the last three days. On physical examination, his abdomen is distended and tender to palpation in all four quadrants, but there is no guarding or rebound. Bowel sounds are present, and increase in intensity as the waves of pain peak. His temperature is 37.1°C (98.9°F), blood pressure is 110/60 mm Hg, pulse is 120/min and respirations are 30/min. Laboratory studies show:

**Hemoglobin:** 14.0 g/dL

**Hematocrit:** 40%

**WBC count:** 14,300/mm<sup>3</sup>

**Blood glucose:** 70 mg/dL

**BUN:** 36 mg/dL

**Amylase:** 120 U/L

**pH:** 7.36

**pO<sub>2</sub>:** 90 mmHg

**pCO<sub>2</sub>:** 28 mmHg

**HC03:** 15 mEq/L

The patient is ambulatory, and asks for pain medication so that he can go home. What is the most appropriate treatment for this patient at this time?

1. ☐ Laxatives and analgesics
2. ☐ Barium enema
3. ☐ Long intestinal tube and IV fluids
4. ☐ Laparotomy ☒
5. ☐ Broad spectrum antibiotics

**INCORRECT** ☐

**The correct answer is 4.**

Colicky or paroxysmal abdominal pain with episodic hyperactive bowel sounds attributable to peristaltic rushes, abdominal distension, and diffuse abdominal tenderness are signs and symptoms of a mechanical intestinal obstruction. Nausea and vomiting may be more frequent with small bowel obstruction (SBO) as compared to large bowel obstruction (LBO) where the ileocecal valve is competent. The contents of the vomitus are typically bilious in proximal SBO and feculent with more distal obstructions. Failure to pass stool or flatus (obstipation) indicates that a complete obstruction has occurred. The patient described is most likely suffering from a complete SBO. A mild leukocytosis and modest increase in amylase are expected with any bowel obstruction.

Whereas a partial SBO may be managed conservatively with nasogastric tube decompression and observation, complete SBO requires surgical correction. This patient's metabolic acidosis, in this setting most likely representing lactic acidosis due to ischemia of a strangulated loop of small bowel, is a further indication for laparotomy. Strangulation leading to ischemic necrosis and perforation of a SB segment is the major life-threatening complication of SBO. The absence of peritoneal signs in this patient suggests that frank bowel necrosis has not yet occurred, but there are signs of ischemia that warrant emergent abdominal exploration to reverse the cause of his mechanical bowel obstruction.



**(Choice 1)** Analgesics may alleviate some of this patient's abdominal pain, and pain control should be one goal of therapy. Laxatives, however, are not appropriate therapy for bowel obstruction as they do not address the primary pathology and may worsen the patient's condition.

**(Choice 2)** A barium enema (BE) would not assist in the diagnosis or treatment of SBO. A BE may be useful in cases of colonic obstruction (LBO) resulting from sigmoid volvulus, wherein a "bird's beak" sign would be seen. Decompression of a sigmoid volvulus may be accomplished with sigmoidoscopy.

**(Choice 3)** IV fluids would be appropriate to treat intravascular volume depletion associated with SBO, but long intestinal tubes are rarely effective in relieving a SBO, and surgery should not be delayed with attempts to utilize such tubes.

**(Choice 5)** Because this patient shows signs of small intestinal ischemia due to strangulation, he is at risk for intestinal bacterial translocation and sepsis. Broad spectrum IV antibiotics may be indicated, but the most urgent issue is surgical decompression of the bowel obstruction.

## 201. Question

1 points

### Category: Medicine

A 65-year-old man comes to the physician for a health maintenance examination. Which of the following screening methods would allow the highest detection rate of prostatic carcinoma in early stages?

1. ☐ Cytologic examination of prostatic secretion
2. ☐ Digital rectal examination alone
3. ☐ Serum PSA determination alone
4. ☒ Serum PSA and digital rectal examination ☐
5. ☐ Transrectal ultrasonography

**INCORRECT** ☐

**The correct answer is 4.**

Intense clinical investigations have been conducted to identify the most effective screening approach to prostatic cancer detection. The aim of an effective screening program is to detect prostatic cancer in the earliest stages, when surgery results in high cure rates. Digital rectal examination (DRE) alone (**Choice 2**) is a specific but not sensitive method; 1.5% of men older than 50 are found to have prostatic neoplasia on DRE alone. In contrast, because of the considerable overlap between the values due to prostatic hyperplasia and those resulting from prostatic cancer, serum PSA alone (**Choice 3**) is sensitive but not specific.

Approximately 2% of men older than 50 are found to have prostatic neoplasia by serum PSA measurements without DRE. The combination of abnormal DRE and elevated PSA affords the highest positive predictive value. The issue, however, is still under active scrutiny. Increasingly more centers are using age-specific reference ranges of serum PSA, along with ratios between free and protein-bound PSA, to improve sensitivity and specificity of this test. **(Choices 1 & 5)** Cytologic examination of prostatic secretion has proved ineffective in detecting prostatic cancer. Transrectal ultrasonography is too expensive as a screening test and it does not significantly improve the detection rate when compared with combined DRE and serum PSA. Transrectal ultrasonography should be reserved mainly for staging purposes and to guide prostatic biopsies.

## 202. Question

1 points

### Category: Surgery

A 72-year-old woman undergoes a partial colectomy for adenocarcinoma of the sigmoid colon. She receives appropriate antibiotic coverage and low-dose heparin prophylaxis. On the 5th hospital day, the patient begins complaining of right chest pain, difficulty in breathing, and a dry cough. Her temperature is 37.9 C (100.2 F), blood pressure is 134/78 mm Hg, pulse is 115/min and regular, and respirations are 20/min. Examination shows crackles in the right chest, but no tenderness or edema in the legs. A chest x-ray shows several areas of atelectasis, as well as patchy pneumonic infiltrates, on both lungs. ECG reveals sinus tachycardia with nonspecific ST changes. Laboratory studies show:

#### Arterial blood gas analysis

**Pa O<sub>2</sub>:** 74mmHg

**PaCO<sub>2</sub>:** 37mmHg

**pH:** 7.35

#### Blood/serum

**Hematocrit:** 40%

**Leukocytes:** 8300/mm<sup>3</sup>

**Lactate dehydrogenase:** 350 U/L Fibrin

**D-dimer:** 600 ng/mL (normal upper limit 500 ng/mL)

Which of the following is the most appropriate step in diagnosis?

1. ☐ Bronchoalveolar lavage
2. ☐ Contrast venography
3. ☐ Pulmonary angiography
4. ☐ Spiral CT scan of the chest ☒

5. ☐ Ultrasonography of the lower extremities

**INCORRECT** ☐

**The correct answer is 4.**

Despite prophylactic treatment with low-dose heparin, this patient has developed signs and symptoms of pulmonary thromboembolism (PTE). This case highlights the diagnostic problems in the clinical approach to PTE, which is frequently encountered in a hospital setting. Ventilation-perfusion scan cannot be expected to be diagnostic in the presence of areas of atelectasis and pneumonic infiltrates. Therefore, spiral CT scan of the chest is a better diagnostic choice.

**(Choice 1)** has no role in the diagnosis of PTE. It is most useful in obtaining samples of lower respiratory tract secretions to determine the etiologic agent of pneumonia.

**(Choice 2)** is used to investigate the presence of deep venous thrombosis (DVT), but it should not be the first diagnostic method in the diagnostic workup of possible PTE.

**(Choice 3)** is the definitive diagnostic method for PTE, but it should be used only after noninvasive procedures have failed.

**(Choice 5)** is a noninvasive method of diagnosing DVT. This procedure (as well as any other test for DVT) should also be carried out only if ventilation-perfusion scanning gives equivocal or inconclusive results.

203. Question

1 points

**Category: Surgery**

An 82-year-old man develops severe abdominal distention, nausea, vomiting, and colicky abdominal pain. He has not passed any gas or stools for the past 12 hours. His vital signs are normal, and his pulse is regular. He has a distended, tympanitic abdomen, with hyperactive, high-pitched bowel sounds. There are no signs of peritoneal irritation. Rectal examination is negative for masses or occult blood, and the rectal vault is empty. Abdominal x-ray films show distended loops of small and large bowel, as well as a very large round gas shadow that is located in the right upper quadrant and tapers toward the left lower quadrant in the shape of a parrot's beak. The patient has never had any abdominal surgery, and he does not have any palpable hernias. Which of the following is the most appropriate next step in management?

1. ☐ Nasogastric suction, IV fluids, and observation
2. ☐ Repeated enemas and laxatives
3. ☐ Emergency celiac and mesenteric arteriogram
4. ☒ Proctosigmoidoscopy ☐
5. ☐ Emergency exploratory laparotomy

**INCORRECT** ☐

**The correct answer is 4.**

The clinical picture and the radiographic description are those of a sigmoid volvulus, a common condition in elderly patients. The endoscopic instrument can untwist the bowel from the inside, relieve the obstruction, and allow placement of a long rectal tube. Repeated episodes may require corrective surgery.

**(Choice 1)** The combination of nasogastric suction, N fluids, and observation is a conservative approach that is appropriate when adhesions are the suspected reason for obstruction affecting only the small bowel. This will occur in patients with a previous laparotomy.

**(Choice 2)** Enemas and laxatives are often needed in elderly patients who develop fecal impaction. However, an empty rectal vault in the physical exam excludes that diagnosis.

**(Choice 3)** Arteriogram comes to mind for the other common abdominal catastrophe in the elderly: mesenteric embolus. In that setting, however, one expects atrial fibrillation or a very recent myocardial infarction as the source of the clot. In addition, the patient is typically sicker and has a silent abdomen and blood in the stool. The x-ray film would show small bowel distention and distention of the colon up to the middle of the transverse, but no huge loop or parrot's beak.

**(Choice 5)** Exploratory laparotomy would be needed if the loop could not be straightened out and emptied endoscopically, or if the patient had signs of strangulation (e.g., fever, an acute abdomen).

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## 204. Question

**1 points**

### Category: Surgery

A 6-year-old male is brought into the emergency room as a trauma patient after being struck by an automobile while playing in his front yard. The patient is hypotensive and has bilateral open femur fractures, from which he is hemorrhaging severely. The child is crying but his SaO<sub>2</sub> level is 99% on room air. You are very concerned that he will exsanguinate from his femur fractures. Based on your presumed diagnosis, what is the best management of this patient's condition?

1. ☐ Small bowel resection
2. ☐ Splenectomy
3. ☐ Arterial embolization ☐
4. ☐ Suprapubic catheter placement
5. ☐ Observation

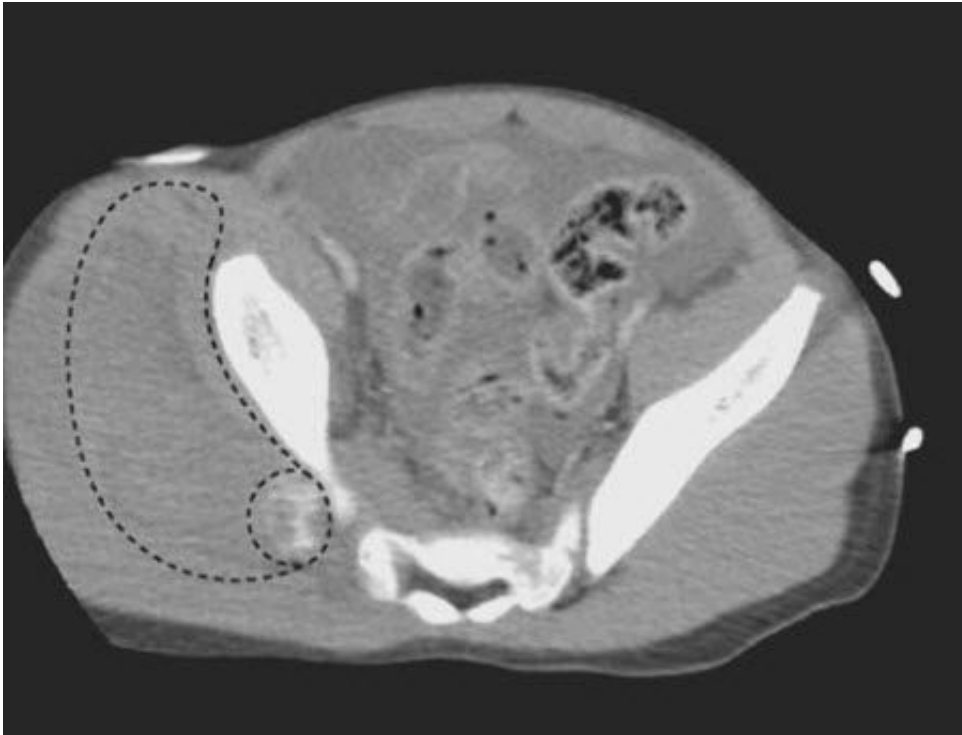
**INCORRECT** ☐

**The correct answer is 3.**

With ongoing bleeding from an arterial source in a patient who is hypotensive, arterial embolization is indicated. Pelvic bleeding is difficult to control operatively; thus angiography is a valuable option. Patients may bleed from fractures, the sacral venous plexus, the major venous vessels, or arterial sources. Venous bleeding can often be controlled with external fixation, while embolization is a better option with arterial bleeds.

**(Choice 1)** A bowel resection would not be indicated as this patient has not suffered a bowel injury.

**(Choice 2)** A splenectomy is not indicated, as no splenic injury is seen in the image.



**(Choice 4)** Suprapubic catheter placement is not an option, as no bladder injury or rupture is noted.

**(Choice 5)** Observation of a hemodynamically unstable patient is never a correct answer.

205. Question

1 points

**Category: Surgery**

A 24-year-old woman comes to the physician's office because of breast pain. She has a 2-month-old baby who she breastfeeds. Her temperature is 38.8 °C (101.9 °F). Examination shows a hard, red, tender and swollen area on her right breast. There is no fluctuance noted. Which of the following is the most appropriate next step in management?

1. ☐ Incision and drainage

2. ☐ Recommend mammogram
3. ☐ Antibiotics and lactation suppression with bromocriptine
4. ☐ Antibiotics. Analgesics and continue breast feeding ☐
5. ☐ Antibiotics, analgesics and nursing only from unaffected breast

**INCORRECT** ☐

**The correct answer is 4.**

The patient described has mastitis associated with nursing. Typically mastitis in this setting results from transmission of a bacterial organism from the infant's nasopharynx to a fissure on the mother's nipple or areola. The most commonly isolated organism is *S. aureus*. Treatment is with analgesics, antibiotics and continued nursing. The most commonly used antibiotics are dicloxacillin or cephalosporins. Continued nursing from the affected breast has been shown to decrease the progression of mastitis to breast abscess and should be recommended in all cases.

**(Choice 1)** Incision and drainage would be indicated for an abscess, but no fluctuance was noted on exam so an abscess is unlikely.

**(Choice 2)** Mammogram before the age of 35 is generally not helpful because the breast tissue is dense. Additionally, the clinical scenario is much more consistent with mastitis than breast malignancy.

**(Choices 3 & 5)** Suppression or discontinuation of lactation is not recommended in mastitis. Continued drainage of milk from the affected breast has been shown to cause resolution of a proportion of cases of mastitis as a sole intervention.

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## 206. Question

**1 points**

### Category: Surgery

An 18-year-old gang member is stabbed in the back, just to the right of the midline. Physical examination shows paralysis and loss of proprioception distal to the injury on the right side, and loss of pain perception distal to the injury on the left side. Which of the following is the most likely diagnosis?

1. ☐ Anterior cord syndrome
2. ☐ Central cord syndrome
3. ☐ Complete transection of the spinal cord
4. ☐ Hemisection of the spinal cord ☐
5. ☐ Posterior cord syndrome

**INCORRECT** ☐

**The correct answer is 4.**

Even if you do not remember all the spinal cord tracts and pathways, you should recognize that deficits in one set of functions below the injury on one side, combined with deficits in a different group of functions on the other side, spells out hemisection. Furthermore, such dean-cut division of one side of the spinal cord can happen only with a knife or a bullet, which is the setting in this vignette.

**(Choice 1)** is characterized by sparing of the posterior columns, with preservation of vibration and position sense. The etiology is typically vascular.

**(Choice 2)** is seen in whiplash injuries, in which it produces severe deficits in the upper extremities, with relative sparing of the lower extremities. Sensory loss consists of loss of pain and temperature sense in a “cape” distribution over the shoulders, lower neck, and upper trunk with posterior column function (light touch, vibration, conscious proprioception) relatively preserved.

**(Choice 3)** Complete transection would result in spastic paralysis below the level of the injury with flaccid paralysis at the level of the injury. Ascending sensory fibers would also be interrupted, producing a total sensory deficit below the level of the lesion.

**(Choice 5)** would result in selective loss of conscious proprioception, vibratory sense, stereognosis, graphesthesia, and two point discrimination. It is fairly rare.

## 207. Question

**1 points**

### Category: Surgery

The patient states that the pain is located primarily around his umbilicus and is unremitting and intense in nature. The physical exam is concerning for pain out of proportion to his exam. Past medical history is significant for diabetes mellitus and atrial fibrillation, for which the patient takes insulin and aspirin, respectively. What is the most likely diagnosis?

1. ☐ Gastritis
2. ☐ Ruptured abdominal aortic aneurysm
3. ☐ Mesenteric ischemia ☐
4. ☐ Ulcerative colitis
5. ☐ Gastric tumor

**INCORRECT** ☐



**The correct answer is 3.**

Pain out of proportion to findings on physical exam is always concerning for mesenteric ischemia. Acute mesenteric ischemia can be caused by arterial thrombosis or embolus, venous occlusion, or “low flow” nonocclusive mesenteric ischemia. This patient is at higher risk for embolic disease due to his history of atrial fibrillation without adequate anticoagulation.

**(Choice 1)** Gastritis may be painless or may be associated with less severe pain, which is typically localized in the epigastric-not periumbilical area.

**(Choice 2)** A patient with a ruptured abdominal aortic aneurysm is likely to be in hemorrhagic shock and have severe abdominal pain radiating to the back or groin and possibly a pulsatile abdominal mass.

**(Choice 4)** Ulcerative colitis typically presents with crampy abdominal pain and bloody stools with a past history of the same, as well as diarrhea.

**(Choice 5)** A gastric tumor typically presents with prolonged history of weight loss and vague upper abdominal discomfort.

208. Question

1 points

**Category: Surgery**

A 76-year-old woman comes to the emergency department because of left lower quadrant (LLQ) abdominal pain and fever. She takes acetaminophen for arthritis and docusate for constipation. A CT scan of the abdomen showed perisigmoid stranding suggestive of inflammation and sigmoid diverticulosis. She was started on intravenous ciprofloxacin and metronidazole; however, she had only mild improvement and is persistently febrile. Examination shows persistent LLQ tenderness to deep palpation. A repeat CT scan now shows a 5 x 6 cm mass in the left iliac fossa. Laboratory studies show:

**Hemoglobin:** 13.0 g/L

**Platelets:** 360,000/mm<sup>3</sup>

**Leukocyte count:** 16,500/mm<sup>3</sup>

Which of the following is the most appropriate next step in management?

1. ☐ Add a cephalosporin to the current antibiotic regimen
2. ☐ guided percutaneous drainage ☒
3. ☐ Laparoscopic drainage
4. ☐ Laparotomy for drainage and debridement
5. ☐ Continue current antibiotics for another 4 weeks

**INCORRECT** ☐

**The correct answer is 2.**

Uncomplicated diverticulitis is characterized by colonic diverticular inflammation resulting in LLQ pain and tenderness, fever and leukocytosis. Associated inflammation may be visualized on CT scan as soft tissue stranding and colonic wall thickening. Uncomplicated diverticulitis may be managed with bowel rest, antibiotics and observation. Complicated diverticulitis occurs when the above scenario progresses to abscess formation, perforation, obstruction or fistulation. In the case described, the patient progressed from uncomplicated to complicated diverticulitis by the formation of an abscess. Her initial management with antibiotics covering both gram negative and anaerobic organisms was appropriate.

Abscesses in any location in the body require drainage; CT guided percutaneous drainage is the best approach in this scenario.

**(Choice 1)** Adding a cephalosporin to the current antibiotic regimen would be of no benefit as the most common enteric organisms, gram-negatives and anaerobes, are well-covered by ciprofloxacin and metronidazole. First and second generation cephalosporins are commonly used for gram-positive organisms, such as cutaneous infections. A few second generation agents cover anaerobes. Third generation agents have expanded gram-negative activity; a few have anti-pseudomonal action.

**(Choice 3)** Laparoscopic drainage is more invasive than CT-guided drainage and should be reserved for cases where CT drainage fails but laparotomy is not desired.

**(Choice 4)** Laparotomy, debridement and drainage are indicated if the percutaneous drainage fails.

**(Choice 5)** While antibiotics should be continued for an extended period of time in this case, drainage is also required to treat the abscess because antibiotics are unable to penetrate the abscess cavity adequately.

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## 209. Question

**1 points**

### **Category: Surgery**

A 62-year-old man is brought to the emergency department after being involved in a motor vehicle collision where he suffered serious burns. On physical examination there are second degree burns covering both upper extremities and third degree burns over the anterior aspects of both lower extremities. On day three of his hospitalization, the patient develops tachycardia and decreased urine output. His blood pressure is 90/60 mmHg, pulse is 120/min, temperature is 95°F (35°C), and respirations are 26/min. Laboratory analysis reveals:

**Blood glucose:** 230 mg/dl

**WBC:** 16,000/mm<sup>3</sup>

**Platelets:** 80,000/mm<sup>3</sup>

Which of the following is the best explanation for this patient's current condition?

1. ☐ Myocardial injury
2. ☐ Extensive protein breakdown
3. ☐ Immune reaction to heterologous proteins
4. ☐ Bacterial infection ☐
5. ☐ Renal glomerular injury

**INCORRECT** ☐

**The correct answer is 4.**

This patient has mild hypothermia (temperature  $<36^{\circ}\text{C}$ ), an elevated white blood cell count, tachypnea and tachycardia on day three of his hospitalization following a severe burn injury. He therefore meets all four of the diagnostic criteria for the systemic inflammatory response syndrome (SIRS):

1. Fever or hypothermia
2. Tachypnea
3. Tachycardia
4. Leukocytosis, leukopenia or bandemia

Patients meeting at least two of these four criteria are considered to have SIRS. SIRS due to infection is called sepsis. Sepsis is considered severe when there is associated end-organ dysfunction such as oliguria, hypotension (systolic  $< 90\text{mm Hg}$ ), thrombocytopenia ( $< 90\text{ mm Hg}$ ). Patients with severe burns may develop hypovolemia from increased capillary leak and compromise of the epidermal permeability barrier. However, hypovolemic shock is not listed as an answer choice here. Another life-threatening complication of severe burns is infection leading to sepsis and septic shock. Pneumonia or wound infections are commonly the underlying cause. In the first week following a burn, *S. aureus* is the most likely cause of wound infection. *P. aeruginosa* is the most common cause of burn wound infections after one week.

**(Choice 1)** Myocardial infarction may complicate burn injuries, but would be unlikely to cause leukocytosis and thrombocytopenia. Additionally, the patient would most likely have a history of other cardiac risk factors.

**(Choice 2)** In the days following a severe burn injury, significant increases in circulating catecholamines and cortisol cause significant protein losses as muscle degradation is used for gluconeogenesis. This increased protein breakdown is a normal part of the burn wound response and is known as the hypermetabolic phase. This phase is typically associated with an elevated cardiac output and would not itself cause hypotension.

**(Choice 3)** Serum sickness, characterized by fever, urticaria, arthritis and nephritis, results from an immune complex reaction against heterologous proteins.

**(Choice 5)** Shock and hypotension are classic causes of acute renal failure (tubular necrosis). Renal failure itself, however, does not typically induce shock or hypotension.

## 210. Question

1 points

## Category: Surgery

A 7-year-old child is brought to the emergency department after being involved in a highway motor vehicle collision. He had blunt trauma to his abdomen. Vital signs are stable, except for a respiratory rate of 30 per minute. Physical examination shows bruising of the upper abdomen, abdominal distention, and tenderness. He is in moderate respiratory distress; breath sounds are decreased on the left side. Chest tube placement shows no blood or air in the pleural cavity. An x-ray film of the chest shows an elevated left hemidiaphragm. Laboratory studies show hemoglobin and hematocrit within normal limits. Which of the following is the most likely diagnosis?

1. ☐ Tension pneumothorax
2. ☐ Hemothorax
3. ☐ Pulmonary contusion
4. ☐ Laceration of the liver
5. ☐ Diaphragmatic hernia ☐

INCORRECT ☐**The correct answer is 5.**

Blunt trauma of the abdomen can cause a sudden increase in intraabdominal pressure, and may lead to rupture of the diaphragm. The diaphragmatic rupture is more common on the left side, since the right side is protected by the liver. The leakage of intraabdominal contents into the chest causes compression of the lungs and mediastinal deviation. Patients may develop marked respiratory distress. Elevation of the hemidiaphragm on the chest x-ray may be the only abnormal finding. Sometimes, there may be evidence of small bowel in the thoracic cavity. The early recognition of diaphragmatic trauma is extremely important since the mortality of undiagnosed injury and subsequent strangulation of the bowel is approximately 30%. Chest x-rays are abnormal in about 85% of the cases; however, the diagnosis is only made in 27% of the cases.

**(Choices 1 & 2)** Tension pneumothorax and hemothorax are unlikely, given the fact that chest tube placement did not reveal a rapid gush of blood or air.

**(Choice 4)** Liver laceration causes pain and an elevation of the right hemidiaphragm.

## 211. Question

1 points

## Category: Surgery

A 69-year-old man, who smokes and drinks heavily, complains of an earache on his left side. The earache has been present for 6 weeks and is not getting any better despite systemic antibiotics and ear drops. On physical examination, he is found to have very poor oral hygiene, 22. A 45-year-old man shows up in the emergency department with a pale, pulseless, paresthetic, painful, and paralytic right lower extremity. The process began suddenly 2 hours ago. On examination, no pulses are apparent in the right lower extremity. Pulse at the wrist is 95/min and grossly irregular. Treatment would likely be based on which of the following?

1. ☐ Audiometry
2. ☐ MRI studies of the eighth nerve
3. ☐ Culture of fluid aspirated from the left ear
4. ☐ Biopsies of the tympanic membrane and ear canal
5. ☐ Panendoscopy and biopsies ☐

**INCORRECT** ☐

**The correct answer is 5.**

An old man who smokes, drinks, and has rotten teeth is the perfect candidate to develop squamous cell carcinoma of the mucosa of the head and neck. An un-healing ulcer in the floor of the mouth, a big lymph node on the side of the neck, hoarseness that does not go away, and unilateral earache are the classic presentations. In this case, the tumor is probably occluding the Eustachian tube and leading to the accumulation of fluid in the middle ear. Systematic examination of the entire mucosa, with biopsies, will demonstrate the primary tumor.

**(Choice 1)** would beautifully document the conductive hearing loss but will do nothing to find the tumor

**(Choice 2)** A tumor of the acoustic nerve would lead to gradual unilateral hearing loss, but it would be sensory, not conductive.

**(Choice 3)** Culture mistakenly assumes the problem to be infectious in origin.

**(Choice 4)** Biopsies of the ear itself are misplaced. The tumor is not there; it is inside the mouth.

212. Question

1 points

**Category: Surgery**

A 16-year-old female restrained driver is involved in a head-on collision with oncoming traffic. The patient arrives intubated to the trauma bay. After your primary assessment, the vital signs are T 36.9°C, HR 135, and BP 100/60. You obtain the chest x-ray shown in the image below. Assuming

the patient remains in stable condition, what study will be required to further assess for intrathoracic injury?



1. ☐ PA and lateral chest x-ray
2. ☐ CT of the chest
3. ☐ Thoracic arch aortogram ☒
4. ☐ Mediastinoscopy
5. ☐ Video-assisted thoracoscopic surgery

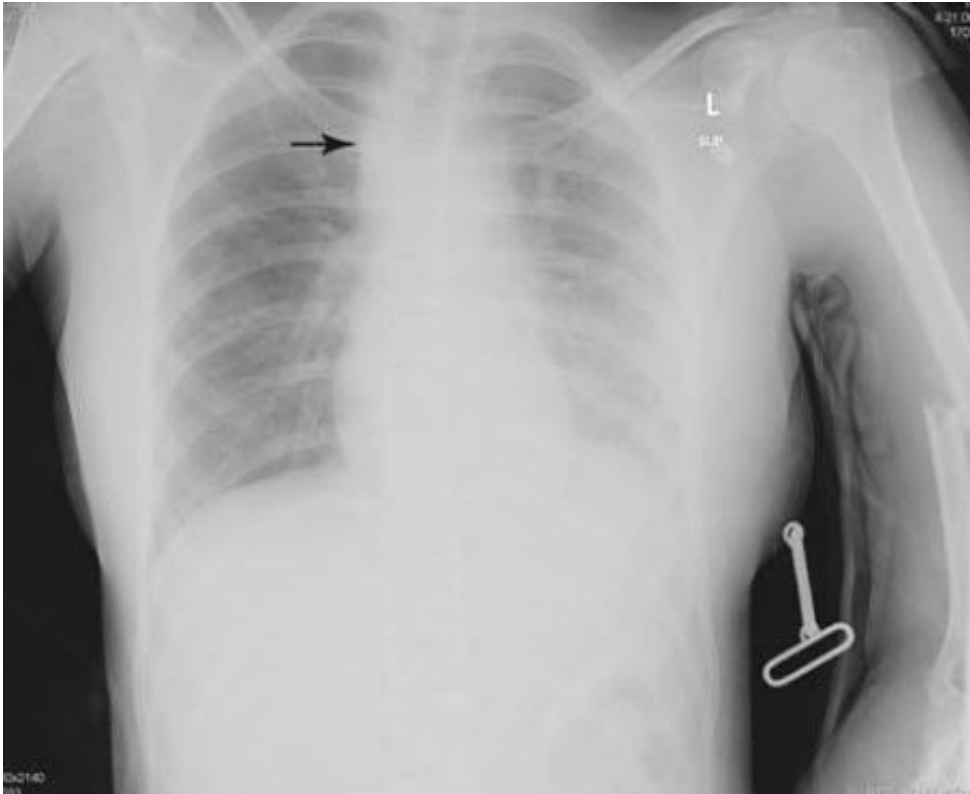
**INCORRECT** ☐

**The correct answer is 3.**

The chest x-ray demonstrated several nonspecific findings suggestive of an aortic injury, including widened mediastinum, apical pleural capping, loss of aortic knob, and depression of left main stem bronchus (note the arrows in the image A). Traumatic aortic disruption is a highly morbid injury, with more than 85% of patients dying at the scene of the accident. In addition, there is a 50% in-hospital mortality rate for every 24 hours this injury goes undiagnosed. For these reasons, it is absolutely critical to have a high index of suspicion in

trauma patients. The gold standard for diagnosing aortic injury remains angiography. The injury usually occurs just proximal to the left subclavian take-off. Treatment consists of surgical placement of an aortic interposition graft. (Note the arrows in image B and image C). Transesophageal echocardiogram (TEE) is rapidly becoming a useful adjunct in the rapid diagnosis of this type of injury. Because it is relatively noninvasive, it should be considered in blunt chest trauma cases. Intensive care practitioners, anesthesiologists, and cardiologists are the most likely disciplines to be trained in the use of this diagnostic method.

**Image A**



**(Choice 1)** A plain film would give only the nonspecific findings mentioned in the explanation for **Choice 3**

**(Choice 2)** A routine chest CT scan is not specific enough to define this injury, although the CT angiogram is gaining acceptance for screening this injury (note the arrow in image). Nevertheless, the aortogram remains the gold standard for diagnosis.



**Image B**



**(Choice 4)** A mediastinoscopy is not indicated for assessing an intrathoracic injury, even in a stable trauma patient.

**(Choice 5)** Video-assisted thorascopic surgery is not indicated in a trauma patient to evaluate a possible aortic disruption.

**Image C**



### 213. Question

1 points

#### Category: Surgery

A 28-year-old man is brought to the emergency department 4 hours after being involved in a motor vehicle collision. His blood pressure is 90/50 mm Hg, pulse is 120/min and respirations are 30/min. Examination shows a stuporous man with bruises over his extremities and upper abdomen. His trachea is midline and his neck veins are flat. His abdomen is moderately distended but non-tender. Immediately after being intubated and placed on mechanical ventilation he goes into cardiac arrest. Which of the following could have prevented cardiac arrest in this patient?

1. ☐ High initial tidal volume
2. ☐ Positive end-expiratory pressure
3. ☐ Chest tube placement
4. ☐ Volume resuscitation ☒
5. ☐ Pain management

**INCORRECT** ☐

**The correct answer is 4.**

This trauma victim has flat neck veins, significant bruising and abdominal distention on physical examination, making hypovolemic shock due to hemorrhage the most likely diagnosis here. Severe hemorrhage causes decreased venous return and therefore decreased end diastolic volume and cardiac output. It also causes increased sympathetic activity to constrict the venous capacitance vessels, compensating for the hypovolemia by improving venous return. Positive pressure mechanical ventilation acutely increases intrathoracic pressure, increasing right atrial pressure and decreasing systemic venous return. This sudden loss of venous return may cause acute circulatory failure and death. Additionally, the sedative medications used prior to intubation relax venous capacitance vessels and may themselves cause circulatory failure by acutely decreasing venous return in the hypovolemic patient.

**(Choice 1)** Positive pressure mechanical ventilation causes an acute ventricular preload reduction. This effect would have been even more pronounced at higher tidal volume settings, as higher pressures are needed to generate larger tidal volumes.

**(Choice 2)** Positive end expiratory pressure (PEEP) is used to improve oxygenation. Because it increases the mean intrathoracic pressure, it decreases preload and would have worsened this patient's cardiac arrest.

**(Choice 3)** A thoracostomy tube will remove air, blood or excess fluid from the intrapleural space, but it does not dramatically reduce the positive intrathoracic pressure applied by the ventilator to deliver a given tidal volume.

**(Choice 5)** Sedative and analgesic medications may reduce venous tone by a direct relaxing effect on the venous capacitance vessels and/or by a decrease in circulating catecholamines. In either case, such medications may precipitate circulatory failure if the intravascular volume is not first replaced.

214. Question

1 points

**Category: Surgery**

A 42-year-old man develops right calf pain one week after having a left hemi-colectomy. On physical examination, there is moderate right ankle edema and right calf pain with dorsiflexion of the right foot. Duplex ultrasonography shows a clot in the right superficial femoral vein. Which of the following is the most appropriate initial treatment?

1. ☐ Aspirin
2. ☐ Heparin ☒
3. ☐ Streptokinase
4. ☐ Warfarin
5. ☐ Tissue plasminogen activator

**INCORRECT** ☐

**The correct answer is 2.**

This patient has a lower extremity deep vein thrombosis (DVT) and requires therapeutic dosing of unfractionated or low-molecular-weight heparin. Whereas superficial thromboses do not need anticoagulation, DVTs require several months of treatment. Remember that, despite its name, the superficial femoral vein is actually a deep vein of the leg. For a patient with a first-time DVT with a clearly reversible inciting incident (e.g. surgery), a heparin product should be started as the patient transitions to at least three months of warfarin therapy with a goal INR of 2-3. The goal of therapy is to prevent extension of the clot and development of future clots, not lysis of the clot already present.

**(Choice 1)** Aspirin is a platelet inhibitor. It does not modify the coagulation cascade. Aspirin alone is not sufficient therapy for a patient with a DVT.

**(Choice 3)** Streptokinase is a clot-lysing enzyme used to treat ST-elevation myocardial infarctions and thrombotic strokes. Studies have not found a convincing role for thrombolytics in DVT therapy, as they do not improve survival. Thrombolytics may decrease post-phlebitic syndrome, but are not generally recommended for the vast majority of DVT patients.

**(Choice 4)** Warfarin is an essential component of DVT therapy. However, because its mechanism of action involves inhibition of activation of vitamin K-dependent clotting factors, it takes several days to reach therapeutic levels of anticoagulation. Thus, patients need to be

on “bridging” heparin initially while warfarin therapy is initiated.

**(Choice 5)** Tissue plasminogen activator (TPA) is another clot-lysing enzyme used to treat acute ST elevation myocardial infarctions and thrombotic strokes. Like streptokinase, its role in treating DVT s is limited.

## 215. Question

1 points

### Category: Surgery

A 47-year old woman comes to the clinic because of worsening left breast swelling and pain. She had mastitis when she nursed her first child 20 years ago. She has not seen a doctor since that time. She is afebrile. Breast examination shows the left breast is enlarged with a 7 x 6 cm area of edema and erythema. A poorly localized mass without fluctuation is palpated in that area. Scant non-bloody discharge is noted on the nipple, and several large axillary nodes are palpated. Which of the following is the most appropriate next step in management?

1. ☐ Antibiotic active against Streptococci and Staphylococci
2. ☐ Culture of the discharge and treatment depending on the findings of the culture
3. ☐ Drainage, culture of the drained exudate and treatment depending on the findings of the culture
4. ☐ Biopsy for culture and treatment depending on the findings of the culture
5. ☐ Biopsy for histology and treatment depending on the findings of the histology ☐

**INCORRECT** ☐

**The correct answer is 5.**

The patient described most likely has an uncommon form of breast cancer known as inflammatory breast carcinoma. Classically, inflammatory breast carcinoma presents as a brawny edematous cutaneous plaque with a “peau d’ orange” (orange peel) appearance overlying a breast mass. As this is an aggressive tumor, most patients also present with axillary lymphadenopathy, and one quarter of patients are subsequently found to have metastatic disease. Another sign that indicates the possibility of breast cancer in this patient is spontaneous nipple discharge. Nipple discharge in a non-lactating woman should always raise suspicion for breast cancer, especially if spontaneous, unilateral, and localized to a single duct, occurs in a patient over 40 years old, is bloody or is associated with a mass. Clinically, inflammatory breast cancer cannot be differentiated from an infectious process, such as a breast abscess, with 100% certainty. Therefore, a biopsy for histology should be done first to exclude or confirm that diagnosis.

**(Choices 1 & 2)** These options would be appropriate for a woman suspected of having mastitis. Typically patients with mastitis are younger lactating women. Upon diagnosis of mastitis, patients should be treated with an antibiotic that covers Staphylococci and should be encouraged to continue breastfeeding or breast pumping from the affected breast.

**(Choice 3)** Drainage is necessary if the mass is fluctuant on physical exam; this indicates the presence of an abscess.

**(Choice 4)** Biopsy for culture would be appropriate for cellulitis that fails to respond to empiric antibiotic therapy as acid-fast organisms or fungi may rarely cause mastitis and breast abscess.

## 216. Question

1 points

### Category: Surgery

A 23-year-old male is brought to the emergency department from the scene of a motor vehicle accident. He appears distressed and complains of severe abdominal pain and distention. Urgent laparotomy reveals splenic laceration, and splenectomy is performed. There are no post-operative complications. The patient has no significant past medical history. He drinks alcohol occasionally but denies smoking cigarettes or using illicit drugs. He works as a computer programmer in a small office. Which of the following vaccines is recommended in this patient?

1. ☐ Hepatitis A
2. ☐ Hepatitis B
3. ☐ Meningococcal ☐
4. ☐ Pertussis
5. ☐ Salmonella

**INCORRECT** ☐

**The correct answer is 3.**

Following splenectomy, patients are at increased risk for severe infection caused by encapsulated organisms like *S. pneumoniae*, *N. meningitidis* and *H. influenzae*. *S. pneumoniae* is the most common cause of sepsis in such patients. The spleen plays an important role in immune surveillance. As blood flows through it, antigens are sampled by dendritic cells and presented to helper T-cells, which subsequently activate B-cells to differentiate into antibody-secreting plasma cells. In the absence of specific antibodies, phagocytes are unable to recognize and engulf encapsulated organisms, thereby allowing these organisms to multiply unchecked in the circulation. All patients undergoing

splenectomy should receive vaccinations against *S. pneumoniae*, *N. meningitidis* and *H. influenzae* either prior to or immediately following surgery. Pneumococcal vaccine boosters are required every 5 years.

**(Choice 1)** Hepatitis A is a fecal-oral virus that causes acute viral hepatitis. Vaccination against this virus is recommended for all children, as well as for high risk adults, including patients with chronic liver disease, patients traveling to endemic areas, sewer workers, drug users, food handlers and homosexual men.

**(Choice 2)** Hepatitis B is a parenterally- and sexually-transmitted virus that can cause acute and chronic hepatitis. Vaccination is recommended for all infants and children universally.

**(Choice 4)** The standard childhood vaccination series includes vaccination against Pertussis. Asplenic patients are not at increased risk for infection with this organism.

**(Choice 5)** *Salmonella typhi* vaccinations are available for patients traveling to endemic countries for a prolonged period of time but are not recommended for post-splenectomy patients. Patients with sickle cell disease are at increased risk for *Salmonella osteomyelitis*.

## 217. Question

1 points

### Category: Surgery

A 34-year-old man comes to the physician after being involved in a street fight. He has a painful and swollen left arm. Neurovascular examination shows no abnormalities. An x-ray film of the arm shows a fracture of the midshaft of the humerus. Closed reduction of the fracture is done and the arm is kept in a hanging cast. One hour later he has numbness of the left wrist and marked limitation of extension at the wrist. Which of the following is the most likely diagnosis?

1. ☐ Radial nerve injury ☐
2. ☐ Brachial artery injury
3. ☐ Compartment syndrome
4. ☐ Ulnar nerve injury
5. ☐ Median nerve injury

**INCORRECT** ☐

**The correct answer is 1.**

Radial nerve passes through the radial groove, which is on the posterior surface of humerus. It is the most commonly injured nerve in fracture of midshaft of humerus. Injury can occur at the time of fracture due to traction of nerve by the fracture end or after the reduction of fracture due to impingement of the radial nerve during closed reduction as in this patient. Radial nerve injury would lead to wrist drop due to marked limitation of extension at wrist joint.



**(Choice 2)** Brachial artery is not commonly injured in fracture of mid shaft of humerus; however, it is commonly injured in supra condylar fracture of humerus, commonly seen in children. The signs and symptoms of brachial artery injury are those of ischemia (pain, pallor, pulselessness, paresthesia and pressure).

**(Choice 3)** Compartment syndrome can occur following a fracture due to increase in compartment pressure secondary to edema and/or bleeding. It would also result in 5 P's (pain, pallor, pulselessness, paresthesia and pressure). It can occur in any compartment of body but is most commonly seen in forearm and calf. Nerve palsy is not very common in compartment syndrome.

**(Choice 4)** Ulnar nerve is also a common nerve injury in association with humeral fracture. Its injury would cause a claw hand.

**(Choice 5)** Median nerve is not commonly injured in humeral fracture and its injury would cause loss of sensation of skin over lateral three and half fingers and lateral half of palm.

218. Question

1 points

**Category: Surgery**

A 38-year-old woman visits her family physician because of her concern about a lump in her left breast, which she noticed after a fall approximately 1 week previously. She does not smoke, drinks wine on social occasions, and takes birth control pills. She is a divorced mother of two and recently returned to the dating scene. There is no family history of breast cancer. Physical examination reveals a rather stocky woman with pendulous breasts. She has a moderate sized, nontender, irregular lump in the lower outer quadrant of her left breast. The overlying skin appears thickened. No nipple discharge is present, and she has no axillary lymphadenopathy. The right breast and axilla are normal. Mammography reveals increased density in the affected region. Ultrasound guided fine needle aspiration biopsy (FNAB) was performed. The pathology report was consistent with a diagnosis of fat necrosis. Which of the following is the most appropriate next step in the management of this patient?

1. ☐ Excise the mass
2. ☐ Repeat fine needle aspiration biopsy after 1 month
3. ☐ Repeat mammography in a month
4. ☐ Reassure the patient, and follow up in a few weeks ☐
5. ☐ Mastectomy

**INCORRECT** ☐



**The correct answer is 4.**

Fat necrosis is usually seen in stocky women with large pendulous breasts. Its importance lies in its ability to mimic breast carcinoma. A history of trauma (such as that from use of a seat belt) may or may not be present. Furthermore, a history of trauma alone is not diagnostic. Trauma on the other hand, may have drawn the attention of the patient to the lump, which is often painless. Fat necrosis usually presents as a nontender, irregular, firm breast lump with thickening of the overlying skin or retraction, giving it the classic peau d'orange appearance—and raising doubts about the diagnosis. The lump usually decreases in size with time. However, a residual cyst within the confines of the breast may linger on. The patient should be reassured and followed up in a few weeks **(Choice 4)**. Although mammography may demonstrate nonspecific changes or mimic carcinoma, ultrasound will often prove useful in coming to a diagnosis. The diagnosis can be confirmed by core biopsy under ultrasound guidance, as was done in this case. Histologically, the lesion consists of lipid-laden macrophages, scar tissue, and chronic inflammatory cells. Since epithelial tissue is not involved, there is no potential for malignancy.

**(Choice 1)** is not indicated, as the mass resolves over time.

**(Choice 2)** A repeat fine-needle biopsy will not contribute to diagnosis in case of doubt. Should the need arise; an open biopsy would be in order.

**(Choice 3)** Repeating the mammography after a month would not be helpful.

**(Choice 5)** is totally uncalled for, and would constitute malpractice.

219. Question

1 points

**Category: Surgery**

A young man is shot in the upper part of the neck with a .22 caliber revolver. Inspection of the entrance and exit wounds indicates that the trajectory of the bullet is all above the level of the angle of the mandible, but below the skull. He is fully conscious and neurologically intact. A steady trickle of blood flows from both wounds, and it does not seem to respond to local pressure. He is hemodynamically stable. Which of the following is the most appropriate next step in diagnosis?

1. ☐ Continued clinical observation
2. ☐ Barium swallow
3. ☐ Arteriogram ☐
4. ☐ Endoscopy
5. ☐ Surgical exploration

**INCORRECT** ☐

**The correct answer is 3.**

In gunshot wounds of the upper zone of the neck, the main concern is the possibility of significant vascular injuries. The area is too high to involve the aerodigestive tract, and it is also rather difficult to explore surgically. Arteriogram offers the best way to assess the extent of the injuries, and also provides a way for embolization of major arteries that might be bleeding significantly.

**(Choice 1)** is the second-best answer, but it would delay recognition of significant vascular injuries that the arteriogram might demonstrate. Clinical observation is often all we do in asymptomatic stab wounds, where serious damage is less likely to occur.

**(Choice 2)** Barium studies are essential when one suspects esophageal injury that is not demonstrated by Gastrografin swallow. As pointed out above, however, the area of injury here is well above where the esophagus begins.

**(Choice 4)** is incorrect for the same reasons that barium studies have no role in this case: the trajectory of the bullet is too high to involve the aerodigestive tract.

**(Choice 5)** might be unavoidable in hemodynamically unstable patients whose vascular injuries cannot be controlled by arteriographic embolization. Surgery can be performed in this area if needed, but for technical reasons it is not our first choice of management.

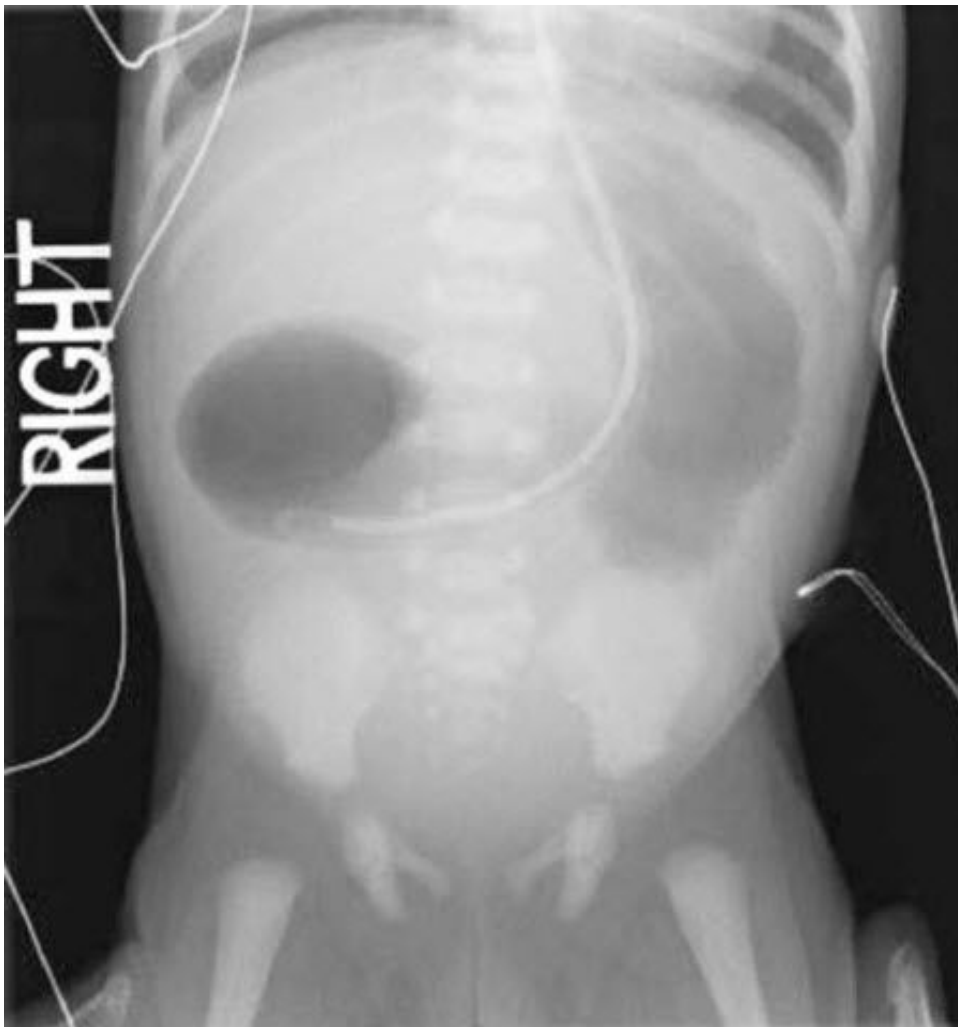
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220. Question

1 points

**Category: Surgery**

You are called to the newborn intensive care unit to evaluate a 36-hour-old infant whose abdomen has become distended, associated with bilious emesis. After performing your history and physical exam, you obtain an abdominal x-ray. What is the most likely diagnosis in this case?

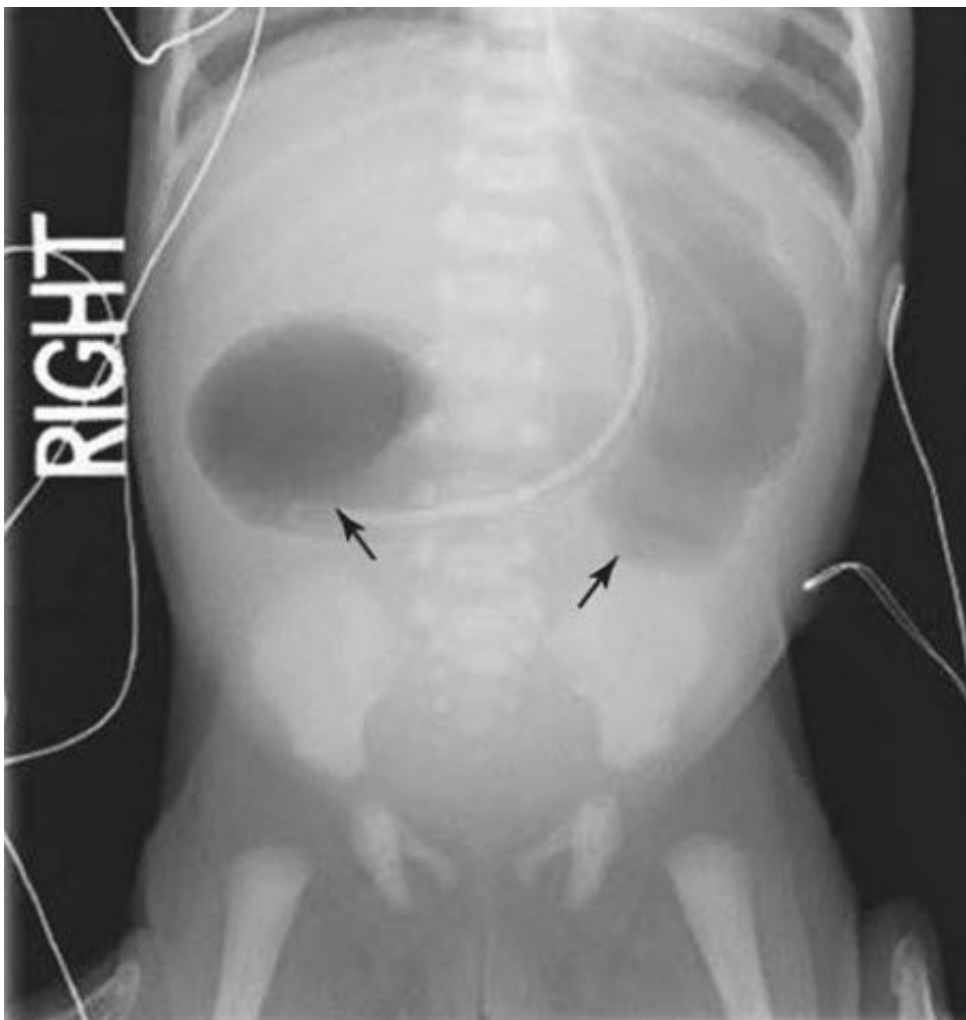


1. ☐ Midgut volvulus
2. ☐ Hypertrophic pyloric stenosis
3. ☐ Duodenal atresia ☒
4. ☐ Meconium ileus
5. ☐ Hirschsprung's disease

**INCORRECT** ☐

**The correct answer is 3.**

Bilious emesis in a newborn should be evaluated immediately to rule out malrotation and midgut volvulus. The “double bubble” sign seen in the image (note the arrows) is associated with duodenal atresia. Duodenal atresia is frequently associated with other anomalies such as anal atresia, tracheoesophageal fistula with esophageal atresia, and vertebral defects. Obstruction can be due to a duodenal web, duodenal atresia, duodenal stenosis, or annular pancreas.



**(Choice 1)** A midgut volvulus is a surgical emergency due to compromised blood supply to the bowel and increases the risk for developing ischemic bowel. It is part of the differential diagnosis for newborns with bilious emesis, but a “double bubble” sign is virtually pathognomonic for duodenal atresia.

**(Choice 2)** Pyloric stenosis presents as rapid, nonbilious projectile vomiting of feeding in infants approximately 6 to 8 weeks of age. It is more common in males than in females (4:1 ratio), and is most common in first-born males.

**(Choice 4)** Meconium ileus is a distal ileal obstruction caused by thick, inspissated meconium. It is frequently associated with cystic fibrosis. Xray findings include dilated loops of bowel and a ground-glass appearance of meconium mixed with air in the right lower quadrant (soap bubble sign).

**(Choice 5)** Hirschsprung’s disease involves an aganglionic colonic segment with secondary colonic obstruction. It is not associated with bilious emesis.

221. Question

1 points

**Category: Surgery**

A 42-year-old moderately obese female complains of abdominal discomfort two days after undergoing an elective cholecystectomy. Her past medical history is significant for hypertension, diabetes mellitus and hyperlipidemia. Her blood pressure is 132/90 mmHg and her heart rate is

76/min. Physical examination reveals a distended abdomen with decreased bowel sounds. Which of the following is most likely contributing to her current condition?

1. ☐ Insulin for glucose control
2. ☐ Morphine for pain relief ☐
3. ☐ Perioperative antibiotics
4. ☐ Metoclopramide for nausea
5. ☐ Absence of bile storage reservoir

**INCORRECT** ☐

**The correct answer is 2.**

This patient is suffering a postoperative ileus. An ileus is a functional defect in bowel motility without an associated physical obstruction. Abdominal surgery is the most common cause, with some degree of ileus occurring following most abdominal procedures. Signs and symptoms of postoperative ileus include nausea, vomiting, and abdominal distention, failure to pass flatus or stool, and hypoactive or absent bowel sounds on physical examination. (In contrast, mechanical bowel obstruction causes hyperactive “tinkling” bowel sounds.)

Contributors to defective bowel motility in the postoperative setting include: increased splanchnic nerve sympathetic tone following violation of the peritoneum, local release of inflammatory mediators, and postoperative narcotic (opiate) analgesics. Opiates contribute to poor bowel motility by causing disordered peristalsis.

**(Choice 1)** Chronic poor glucose control can cause gastroparesis, a condition characterized by early satiety, nausea and postprandial vomiting. Insulin itself has no known effect on bowel motility.

**(Choice 3)** Common antibiotics are not known to directly inhibit intestinal motility though many can cause gastrointestinal upset. Erythromycin is frequently used as a promotility agent; it functions by binding motilin receptors in the gut.

**(Choice 4)** Metoclopramide is a dopamine antagonist with promotility effects. Specifically, it increases lower esophageal sphincter contraction and enhances gastric emptying.

**(Choice 5)** Following cholecystectomy, bile is still produced by the liver and secreted into the duodenum via the intact common bile duct. The bile acid pool is then stored in the upper small intestine during fasting. Occasionally, post-cholecystectomy diarrhea can occur due to bile acid malabsorption and shortened intestinal transit times.

A 32-year-old male is rushed to the emergency room after a motor vehicle accident. He was driving 55 mph when he suddenly lost control of his vehicle and hit a tree. He was wearing a seat belt. On physical examination, the patient appears scared and complains of moderate chest and abdominal discomfort. His voice is soft. His blood pressure is 190/100 mmHg and his heart rate is 1 OD/min. The pupils are symmetric and reactive to light and the trachea is midline. You note bruising over the chest and upper abdomen. No penetrating injuries are evident. Which of the following injuries is most likely in this patient?

1. ☐ Esophageal rupture
2. ☐ Tracheobronchial disruption
3. ☐ Vagus nerve disruption
4. ☐ Aortic rupture ☐
5. ☐ Pulmonary contusion

**INCORRECT** ☐

**The correct answer is 4.**

This patient has experienced sudden, forceful deceleration resulting in blunt trauma to the chest and abdomen. The most common vascular injury following blunt thoracic trauma is aortic rupture. The two most common sites of aortic rupture are the ascending aorta just above the aortic valve and the descending aorta just distal to the left subclavian artery. Most patients with ascending aortic rupture have concomitant severe damage to the heart itself, and generally expire before ever reaching the hospital. Those who survive this injury long enough to present for medical care typically have injury to the descending aorta. Still, only one in five patients survives aortic rupture.

Clinically, patients with aortic rupture may not exhibit any symptoms or obvious signs of thoracic trauma. The diagnosis requires a high index of suspicion and should be ruled out promptly as part of the work-up of thoracic trauma. In patients who initially survive this injury, a hematoma forms that is contained within the mediastinum, thereby preventing exsanguination. Pseudocoarctation, with hypertension in the upper extremities and normo- or hypotension in the lower extremities, may be seen on exam. This is caused by compression of the aortic lumen by the aforementioned hematoma. This hematoma may also compress other nearby structures, such as the left recurrent laryngeal nerve, which loops beneath the aortic arch just behind the ligamentum arteriosum to innervate most of the laryngeal muscles. Damage to this nerve would cause unilateral vocal cord paralysis and a weak, hoarse and breathy voice.

**(Choice 1)** Esophageal rupture can occur after blunt abdominal trauma due to a sudden, explosive increase in intraabdominal pressure against a closed glottis. Patients typically exhibit severe chest pain, pneumomediastinum and subcutaneous crepitus in the neck.

**(Choice 2)** Tracheobronchial rupture is a rare complication of blunt chest trauma. Patients classically present with dyspnea and hemoptysis. Pneumothorax and pneumomediastinum are often observed, and the air leak following chest tube placement is typically large.

**(Choice 3)** Injury to the vagus nerve proximal to the left recurrent laryngeal nerve may also cause a weak voice, but an isolated injury to the vagus nerve is not the most likely injury here given the patient's total clinical picture.

**(Choice 5)** A lung contusion can develop after blunt chest trauma and may cause hemorrhages of varying sizes. However, lung contusion would not affect the voice or cause hypertension.

## 223. Question

1 points

### Category: Surgery

A 40-year-old male developed shortness of breath during the postoperative recovery period. He had a large ventral hernia repair a few hours ago. He has no significant past medical history. He has never smoked. His temperature is 37.6 °C (99.8 °F), blood pressure is 100/60 mm Hg, pulse is 100/min and respirations are 30/min. Lungs are clear to auscultation except for a few rales at the bases. An x-ray film of the chest shows bibasilar atelectasis. Arterial blood analysis shows:

pH: 7.35

P<sub>O<sub>2</sub></sub>: 70 mm Hg

pC<sub>O<sub>2</sub></sub>: 45 mm Hg

HCO<sub>3</sub><sup>-</sup>: 28 mEq/L

Which of the following is the most appropriate next step in management?

1. ☐ Physiotherapy and respiratory exercises ☐
2. ☐ Begin broad-spectrum antibiotics
3. ☐ Perfusion/ventilation scintigraphy
4. ☐ Administer bronchodilators and steroids
5. ☐ Check serial cardiac enzymes

**INCORRECT** ☐

**The correct answer is 1.**

Respiration and hemodynamics may be altered after repair of large hernias. This results from the increased pressure within the abdominal cavity that results from replacement of the large hernia contents into the peritoneal cavity. The increased intraabdominal pressure impairs inferior motion of the diaphragm thereby causing hypoventilation. Anesthetics and postoperative pain control measures (narcotics) can also impair ventilation. Venous return to the heart is also decreased due to increased intraabdominal pressure; this may result in hypotension if severe. The arterial blood gas values in this patient are consistent with



hypoventilation (slightly decreased pH, increased pCO<sub>2</sub>, hypoxemia). Early physiotherapy and respiratory exercises (blowing against resistance) are indicated to prevent atelectasis, mucous plugging and pneumonia.

**(Choice 2)** Broad-spectrum antibiotics are indicated for nosocomial pneumonia, which is unlikely on the first post-operative day.

**(Choice 3)** Pulmonary embolism would result in hypoxia accompanied by hypocapnia and respiratory alkalosis due to the compensatory hyperventilation.

**(Choice 4)** Bronchial obstruction (asthma, COPD) would produce similar arterial blood gas changes (respiratory acidosis), but in such cases, auscultatory findings such as wheezing and prolonged expiration would be present.

**(Choice 5)** This clinical scenario is not consistent with myocardial infarction, which is unlikely in a 40 year old with no known risk factors.

## 224. Question

1 points

### Category: Surgery

On the day after Thanksgiving, a young man brings his 50-year-old mother to the emergency department. Her son tells the triage nurse that, after consuming a hearty Thanksgiving meal, his mother felt ill. Her pain and symptoms grew worse during the night and early morning, so he thought he ought to bring her in. He also tells her that his mother has had two or three earlier episodes of gallbladder trouble but none so severe. The nurse notes the patient has a temperature of 102°F (38.9°C), blood pressure of 90/42 mm Hg, severe right-upper-quadrant (RUQ) pain, and jaundice. She also observes that she seems to have a problem with answering her questions and sometimes babbles incoherently. Upon examination by the attending physician, the patient is also found to have mild hepatomegaly. She has normal heart sounds, but a pulse rate of 125/min. Her white cell count is  $13.6 \times 10^3/\mu\text{L}$  (normal range,  $4.8\text{--}10.8 \times 10^3$ ), her total bilirubin level is 6.6 mg/mL (36.3  $\mu\text{mol/L}$ ; normal range, 0.1-1.2 mg/mL [2.0-21  $\mu\text{mol/L}$ ]); her  $\gamma$ -glutamyl transpeptidase (aka,  $\gamma$ -glutamyltransferase) activity value is 105 units/mL (normal, 9-85 units/mL), and her alkaline phosphatase value is 176 units/L (normal range 41-133 units/mL). Urine analysis was normal. Which of the following is the most likely diagnosis?

1. ☐ Amebic liver abscesses
2. ☐ Acute hepatitis
3. ☐ Acute pancreatitis
4. ☐ Ascending cholangitis ☒
5. ☐ Sclerosing pericholangitis

INCORRECT ☐

**The correct answer is 4.**

The patient has ascending cholangitis, which results from concurrent biliary tract infection and obstruction (e.g., by a stone, stricture, or neoplasm). Attacks are often precipitated by heavy fatty meals. The classic Charcot triad is colicky, right upper quadrant pain; fever; and jaundice to which, in cholangitis, can be added mental status change and sepsis. Laboratory studies reveal an absolute neutrophilic leukocytosis, direct hyperbilirubinemia, and elevation of alkaline phosphatase and -glutamyltransferase, which are increased in obstructive jaundice. Infection and subsequent sepsis may result from infection by *Escherichia coli*, *Klebsiella* species, enterobacteria, enterococci, and/or group D streptococci. Although 95% of the patients who present this way have common duct stone obstruction, only a small minority of patients with acute cholecystitis present in this manner. This presentation is associated with infection, which often results from repeated attacks, as in the case described in the vignette. Septicemia frequently occurs as infected bile regurgitates into the liver and the liver sinusoids, and the tachycardia and hypotension are signs of septic shock. Ascending cholangitis is the most common cause of liver abscesses, because the infection extends into the portal triads. The initial treatment is with intravenous antibiotics. If the inflammation does not subside, then surgery is indicated to decompress the common bile duct and remove the source of obstruction. The mortality rate approaches 90% in untreated patients.

**(Choice 2)** is not associated with colicky pain and has a mixed indirect and direct hyperbilirubinemia.

**(Choice 3)** presents with a steady, boring, mid-epigastric pain, with radiation into the back or periumbilical area. Jaundice is unusual.

**(Choice 1)** does not present with colicky pain or jaundice. The organisms drain into the liver via the portal vein from a primary site of infection in the cecum.

**(Choice 5)** is most commonly associated with ulcerative colitis.

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225. Question

1 points

**Category: Surgery**

A 65-year-old male presented to the ER with increasing shortness of breath, fever and productive cough of 2 days duration. He has smoked for several years and has been on home oxygen. Chest x-ray showed right lower lobe consolidation. His vital signs on admission were 38.7 °C (101.7 °F), blood pressure 120/76 mm Hg, pulse 110/min and respirations 26/min. His condition worsened over the next several hours and required orotracheal intubation and mechanical ventilation. He was transferred to the intensive care unit. Placement of a central venous catheter in the right subclavian vein for IV access was attempted. After the line is successfully placed, the patient begins to deteriorate. Repeat vital signs are blood pressure 80/50 mm Hg and pulse 130/min. Examination shows absent breath sounds on the right side and distended neck veins. Which of the following is the most appropriate next step in management?

1. ☐ Stat chest x-ray

2. ☐ Arterial blood gas analysis
3. ☐ Pericardiocentesis
4. ☐ Needle thoracostomy ☐
5. ☐ Intravenous fluids and dopamine

**INCORRECT** ☐

**The correct answer is 4.**

This patient has developed a tension pneumothorax as a complication of subclavian central venous catheter placement. Placement of subclavian central venous catheters accounts for approximately one-fourth of iatrogenic pneumothorax. Tension pneumothorax is a life-threatening condition caused by air within the pleural space that displaces mediastinal structures and compromises cardiopulmonary function. This condition develops when injured tissue forms a one-way valve allowing air to enter the pleural space but preventing it from escaping naturally. It is characterized clinically by rapid onset severe shortness of breath, tachycardia, tachypnea, hypotension, and distention of the neck veins due to SVC compression. Tension pneumothorax is a clinical diagnosis and treatment should be initiated immediately with needle thoracostomy to decompress the pleural cavity. This should be followed by an emergency tube thoracostomy with underwater seal.

**(Choice 1)** In tension pneumothorax, an x-ray will show deviation of the trachea and mediastinum away from the affected side and increased lucency on the affected side of the chest. One should not delay treatment of this emergent condition by waiting for radiographic studies.

**(Choice 2)** While an ABG would give information about the severity of respiratory compromise, waiting for such a result is inappropriate. A needle or tube thoracostomy should be the first step in management of tension pneumothorax.

**(Choice 3)** Pericardiocentesis is indicated for emergent treatment of cardiac tamponade. Cardiac tamponade is characterized by hypotension, tachycardia, elevated systemic venous pressure and pulsus paradoxus.

**(Choice 5)** Fluid resuscitation and vasopressors are appropriate treatments for shock. While shock may cause hypotension and sudden clinical deterioration, it is less likely than tension pneumothorax in this scenario.

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226. Question

1 points

**Category: Surgery**

A 22-year-old primigravida woman at 33 weeks gestation is brought to the emergency department after a tonic clonic seizure. On arrival, she also has visual disturbances and a headache. She is given magnesium sulfate and hydralazine. She soon regains consciousness but cannot move her right arm; however, she can move her fingers. Her temperature is 37.2 °C (99 °F), blood pressure

is 160/100 mm Hg, pulse is 110/min and respirations are 20/min. Examination shows her arm extended along the chest and internally rotated. There is no sensory loss on the arm, but there is an inability to externally rotate the shoulder. Deep tendon reflexes (DTR) are intact. Which of the following is the most likely cause of her inability to move her hand?

1. ☐ Todd's paralysis
2. ☐ Magnesium toxicity
3. ☐ Anterior dislocation of shoulder joint
4. ☐ Posterior dislocation of shoulder joint ☐
5. ☐ Dislocation of acromioclavicular joint

**INCORRECT** ☐

**The correct answer is 4.**

The patient described has experienced a grand mal (tonic-clonic) seizure, most likely as a result of eclampsia. Eclampsia is characterized by seizures in the setting of preeclampsia, which itself is characterized by the triad of hypertension, proteinuria and edema. Eclampsia and preeclampsia are most common in young primigravida women. The seizures in eclampsia are typically self-limited tonic clonic in nature. Initial treatment includes magnesium sulfate and antihypertensives, but delivery is the only definitive therapy. Posterior dislocation of the glenohumeral joint classically occurs during a tonic-clonic seizure or electrocution. On exam the arm is held adducted and internally rotated and fullness is palpable posteriorly while the anterior shoulder is flat.

**(Choice 1)** Todd's paralysis refers to transient unilateral weakness following a tonic-clonic seizure.

**(Choice 2)** Magnesium toxicity manifests first with diarrhea, nausea, vomiting and generalized muscle weakness. DTR will be decreased or absent. This is unlikely in this patient who just received magnesium.

**(Choice 3)** Anterior dislocations are the most common form of shoulder dislocation. In anterior dislocations, the arm is held in slight abduction and external rotation.

**(Choice 5)** Acromioclavicular dislocation (shoulder separation) is not likely in the above setting. This injury requires a significant traumatic blow to the shoulder. Symptoms include pain and swelling; no arm posturing is associated with this injury.

A 54-year-old woman is brought to the emergency department after a head-on automobile accident. On arrival, she is breathing well. She has multiple bruises over the chest and multiple sites of point tenderness over the ribs. X-ray films show multiple rib fractures on both sides, but the lung parenchyma is clear, and both lungs are expanded. Two days later she is in respiratory distress, and her lungs “white out” on repeat chest x-ray films. Which of the following is the most likely diagnosis?

1. ☐ Flail chest
2. ☐ Myocardial contusion
3. ☐ Pulmonary contusion ☒
4. ☐ Tension pneumothorax
5. ☐ Traumatic rupture of the aorta

**INCORRECT** ☐

**The correct answer is 3.**

Severe blunt trauma to the chest can produce obvious injuries, such as broken ribs, but it can also lead to pathology that may not show up until later, such as pulmonary contusion or myocardial contusion. The former produces the classic “white-out” of the lung (contused lung is exquisitely sensitive to fluid overload, and the fluid leaks easily) along with respiratory distress.

**(Choice 1)** is recognized by the paradoxical motion of a segment of the chest wall, which is not described here.

**(Choice 2)** shows up like an infarction, both clinically (arrhythmias) and on ECG. You would expect it in association with sternal fractures rather than with rib fractures.

**(Choice 4)** produces shock and high central venous pressure (CVP), along with the respiratory distress, and air is seen in the x-ray.

**(Choice 5)** The ultimate hidden injury in blunt chest trauma is traumatic rupture of the aorta. X-ray films would show widening of the mediastinum, and the eventual clinical manifestation would be exsanguinating hemorrhage.

228. Question

1 points

**Category: Surgery**

A 24-year-old man comes to the physician 24 hours after sustaining an injury to the right knee while playing soccer. He can walk, but he limps on the right side. He reports that he was hit by another player on the lateral side of his right knee, but did not feel a snap or pop at the time of the accident. On examination, the right knee appears normal, but palpation elicits tenderness along the medial

aspect of the joint line. Increased laxity is observed when a valgus stress is applied to the knee flexed at 30 degrees, but not when the knee is in full extension. Lachman's test and posterior drawer tests are negative. Which of the following is the most likely diagnosis?

1. ☐ Meniscus injury
2. ☐ Sprain of the lateral collateral ligament
3. ☐ Sprain of the medial collateral ligament ☐
4. ☐ Tear of the anterior cruciate ligament
5. ☐ Tear of the posterior cruciate ligament

**INCORRECT** ☐

**The correct answer is 3.**

The patient presents with the typical symptomatology associated with sprain of the medial collateral ligament. This ligament connects the distal femur to the proximal tibia on their medial aspects. Injuries to this ligament are the most frequent among traumatic knee injuries and typically result from a lateral blow to the joint. The injured knee is sometimes swollen, but often inspection reveals only walking difficulties. Physical examination should include maneuvers that assess ligamentous stability, comparing the injured and uninjured sites. A valgus stress test demonstrating increased laxity of the knee confirms sprain of the medial collateral ligament. These tests should be performed on both flexed and extended knees. Increased laxity of ligaments with the knee in full extension indicates concomitant capsular injury (absent in this case).

**(Choice 1)** often results in a "locked-up" knee and is usually due to traumas that have a twisting component. Appropriate tests to evaluate meniscal integrity (such as the McMurray) should be part of the physical examination in case of knee injuries.

**(Choice 2)** is usually due to blows to the medial aspect of the knee. The varus stress test would be positive.

**(Choices 4 & 5)** Tears of the anterior cruciate ligament and posterior cruciate ligament will result in knee instability. Often, the patient reports feeling a snap or pop at the time of injury. Lachman's test is the most sensitive clinical maneuver to detect injuries to the anterior cruciate ligament. The examiner stabilizes the knee with one hand and pulls the tibia forward. Any forward movement of the tibia (compared with the uninjured side) is considered diagnostic of anterior cruciate ligament tear. The posterior drawer test is used to detect tears of the posterior cruciate ligament.



A 55-year-old-woman of Asian descent goes to the emergency department because of vomiting and severe abdominal cramping of 3 days, duration. Her pain is centered on the umbilicus. She denies being exposed to a viral or bacterial illness. Her medical history includes a previous cholecystectomy and an appendectomy after which she developed an infection. Her abdomen is not tender, but hyperactive, high-pitched peristalsis with rushes coincides with palpable bowel cramping. Abdominal x-ray films taken in the supine and upright positions demonstrate a ladder-like series of distended small bowel loops. Which of the following is the most likely explanation for these findings?

1. ☒ Adhesions ☐
2. ☐ Ascaris infection
3. ☐ Cancer
4. ☐ Intussusception
5. ☐ Volvulus

**INCORRECT** ☐

**The correct answer is 1.**

The clinical and radiologic findings are typical of small bowel (jejunoileal) obstruction. If the pain becomes continuous and bowel sounds vanish, suspect that strangulation has occurred. The most frequent causes of small bowel obstruction are adhesions and incarceration in hernias. To investigate adhesions, look for a history of peritonitis, Crohn disease, pelvic inflammations, or abdominal or pelvic surgery.

**(Choice 2)** Overwhelming Ascaris infection can cause small bowel obstruction, most frequently in poorly developed, third-world tropical countries.

**(Choice 3)** Cancer of the duodenum or pancreas is the most common cause of obstruction of the duodenum, but the ladder-like series of dilated bowel loops would not be seen because the obstruction would be proximal to the ileum.

**(Choice 4)** is relatively common in infants but is much rarer (and usually related to tumor) in adults.

**(Choice 5)** is rare in the midgut.

230. Question

1 points

**Category: Surgery**

In the first postoperative day after an open abdominal procedure, a patient develops a temperature of 38.9 C (102 F). He is encouraged to ambulate, cough, and breathe deeply, but he is noncompliant. On the second day, he is still febrile. Incentive spirometry and postural drainage are



instituted, but his participation is less than enthusiastic. He lies in bed all day and hardly moves. By the third day, he is still spiking fevers in the same range. Although efforts to improve his ventilation continue, resolution of his problem will most likely require which of the following?

1. ☐ Doppler studies of deep leg and pelvic veins
2. ☐ Urinalysis, urinary cultures, and appropriate antibiotics
3. ☐ Chest x-ray, sputum cultures, and appropriate antibiotics ☐
4. ☐ Cultures of his wound and wound opening if needed
5. ☐ CT scan of the abdomen and percutaneous drainage of abscess

**INCORRECT** ☐

**The correct answer is 3.**

Fever on the first postoperative day is almost invariably from atelectasis, the treatment of which requires active participation and cooperation from the patient. If atelectasis does not resolve, it leads to the development of pneumonia, which can be identified in chest x-ray films and confirmed with sputum cultures. At that time the process is no longer purely mechanical, but is also infectious, thus requiring antibiotics.

**(Choice 1)** Deep venous thrombosis occurs about 5-7 days after surgery and is a “hidden” source of fever, i.e., nothing else seems to be wrong. This patient is clearly a candidate for thrombosis (he lies in bed doing nothing all day), but right now his problem is probably in the lung.

**(Choice 2)** The urine is a good possibility when the fever starts on day 3, but the persistence of fever since day 1 points to the lung.

**(Choice 4)** Three days is too soon for a wound infection to be the cause of the fever. Five to seven days is a more likely time frame.

**(Choice 5)** Looking for an abdominal abscess is a little premature on the 3rd day after surgery. These typically take a week to 10 days to develop.

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231. Question

1 points

**Category: Surgery**

A young man is brought to the emergency department following a head-on collision at 30 miles per hour. He is awake and alert. Other than a forehead laceration, physical examination is normal and laboratory values are within normal limits. Chest x-ray films are unremarkable. Which of the following is the most appropriate next step in diagnosis?

1. ☐ Echocardiogram

2. ☐ Lateral cervical spine x-ray ☒
3. ☐ CT scan of the abdomen
4. ☐ CT scan of the head
5. ☐ Peritoneal lavage

**INCORRECT** ☐

**The correct answer is 2.**

In patients sustaining trauma, there is a chance of bony cervical spine injury. Iatrogenic injury is to be avoided by immobilization of the cervical spine until bony injury is ruled out by lateral cervical spine x-ray.

**(Choice 1)** An echocardiogram would not be appropriate with a normal physical examination and no suspicious cardiac findings.

**(Choice 3)** CT scan of the abdomen or peritoneal lavage **(Choice 5)** are useful for evaluating the degree of abdominal injury when abdominal examination is inadequate, especially in an unconscious trauma patient.

**(Choice 4)** CT examination of the head is required for, patients with altered mental status or for those in whom an intracranial bleed is suspected.

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## 232. Question

1 points

### Category: Surgery

A 69-year-old man is evaluated after undergoing an elective repair of a rapidly expanding abdominal aortic aneurysm. The surgical procedure was complicated by a significant amount of blood loss and required multiple transfusions. In the postoperative recovery room, he had weakness in both lower extremities and developed urinary retention. Neurologic examination shows spastic paraplegia and loss of pain sensation over the lower extremities; vibratory sensation is intact. Upper extremity examination shows no abnormalities. Which of the following is the most likely pathophysiologic mechanism of the neurologic dysfunction?

1. ☐ Spinal cord ischemia ☒
2. ☐ Hematoma compressing the spinal cord
3. ☐ Mechanical damage of the spinal cord
4. ☐ Mechanical damage to the peripheral nerves
5. ☐ Conversion disorder

**INCORRECT** ☐

**The correct answer is 1.**

The artery of Adamkiewicz arises from the aorta and supplies the anterior circulation of the middle and lower spinal cord. Diminished flow through this artery may result from its thrombosis, ligation, or systemic hypotension. Resultant neurologic dysfunction is due to ischemia of antero-lateral structures of the spinal cord. It includes lower spastic paraplegia, pelvic organ dysfunction, and loss of temperature and pain sensation over the lower extremities. Vibratory and proprioceptive sensation is preserved because posterior circulation of the spinal cord is not affected.

**(Choice 2)** Cord compression from a hematoma can give the similar presentation but is unlikely in this patient. This should be suspected if somebody is on anticoagulants, such as warfarin or heparin.

**(Choice 3)** It is unlikely to have mechanical damage to the spinal cord during AAA repair.

**(Choice 4)** Spasticity is a feature of upper motor neurone lesion.

**(Choice 5)** Psychiatric causes should not be considered when there is clear-cut abnormal physical exam.

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### 233. Question

**1 points**

#### **Category: Surgery**

A 65-year-old male comes to the ER because of sudden onset severe pain in his right leg. He says he has never previously had pain in his leg and denies any recent trauma, fever or chills. He recently suffered an acute anterior wall myocardial infarction that resulted in cardiogenic shock and is currently undergoing cardiac rehabilitation. His other medical problems include hypertension, diabetes and hyperlipidemia. His temperature is 36.7 °C (98 °F), blood pressure is 110/70 mm Hg, pulse is 90/min (regular) and respirations are 16/min. His lungs are clear to auscultation. His heart rate is regular with no murmurs. Below the knee the right leg is cool to touch and appears pale. The dorsalis pedis pulse is not palpable while the popliteal pulses are full. Pulses are normal in the contralateral extremity. Neurologic examination shows numbness over the dorsum of the leg and foot. Which of the following is the most likely cause of his symptoms?

- 1. ☐ Nerve compression
- 2. ☐ Arterial thrombosis
- 3. ☐ Arterial embolism ☐
- 4. ☐ Venous thrombosis
- 5. ☐ Arterial vasculitis

**INCORRECT** ☐

**The correct answer is 3.**

The patient described has suffered acute embolic occlusion of the popliteal artery distal to the popliteal fossa but proximal to the branch point for the anterior tibial artery. Arterial occlusion in the lower extremity may arise due to one of three major causes: embolus, thrombosis or trauma. All forms of arterial occlusion will cause pain, diminished pulses, pallor, and coolness to touch, neurologic deficits and muscle dysfunction in the affected extremity. In embolic arterial occlusion, the pain classically occurs suddenly and is severe. The pulses tend to be diminished or absent in the affected limb and normal in the unaffected limb. The majority of emboli causing such occlusion originate from the heart either from the ventricles following a myocardial infarction or from the atria in the setting of atrial fibrillation.

**(Choice 1)** Nerve compression alone may account for paresthesias and numbness, but it would not cause diminished pulses, coolness to touch, pallor and severe pain. His numbness is due to nerve ischemia (not compression).

**(Choice 2)** Arterial thrombosis results in slow, progressive narrowing of the vascular lumen in the affected limb. Thus, the symptoms have an insidious onset. Additionally, the pulses in patients with arterial thrombosis are usually diminished bilaterally.

**(Choice 4)** Venous thrombosis (DVT) typically causes pain and edema of the lower extremity and may be accompanied by warmth to touch. The pain is typically dull and aching in contrast to the sudden and severe pain described above. Pulselessness is not a feature of DVT.

**(Choice 5)** Arterial vasculitis of any cause will typically be accompanied by constitutional symptoms such as fever, malaise and weight loss as well as other systemic findings specific to each vasculitic syndrome. Examples of arterial vasculitis include Takayasu arteritis, polyarteritis nodosa, temporal arteritis, Churg-Strauss disease and many others.

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## 234. Question

**1 points**

### Category: Surgery

A 34-year-old unrestrained male driver is brought to the ER after a motor vehicle accident. His cervical spine is immobilized. He is stuporous. At the scene of the accident, his blood pressure is 70/30 mm Hg and heart rate is 130/min. Lungs are clear to auscultation. Abdominal wall ecchymosis is present. Abdomen is mildly distended. Bowel sounds are decreased. Neck veins are collapsed. After two liters of intravenous fluids, his blood pressure is 80/40 mm Hg. A focused assessment with sonography for trauma shows blood in the peritoneal cavity but no obvious solid organ injury. Which of the following is the most appropriate next step in management?

1. ☐ Laparoscopy
2. ☐ Laparotomy ☐
3. ☐ X-ray films of the abdomen and pelvis

- 4. ☐ CT scan of the abdomen
- 5. ☐ Diagnostic peritoneal lavage

**INCORRECT** ☐

**The correct answer is 2.**

This patient's history of motor vehicle accident, abdominal wall ecchymosis, distended abdomen, and decreased bowel sounds is suspicious for blunt abdominal trauma. Furthermore, collapsed neck veins and hypotension indicate hemodynamic instability. In a hemodynamically unstable victim of a motor vehicle accident with suspected blunt abdominal trauma, the appropriate management involves cervical spine immobilization, intravenous hydration and FAST (Focused Assessment with Sonography for Trauma). If ultrasound shows blood in the peritoneal cavity of a hemodynamically unstable patient, then urgent laparotomy with surgical repair is indicated. Ultrasound is not reliable in identifying solid organ injury.

**(Choice 1)** The use of laparoscopy in cases of blunt abdominal trauma is debatable and hemodynamic instability is an absolute contraindication to laparoscopy.

**(Choice 3)** X-ray films of the abdomen and pelvis would be useful for identifying pelvic, rib, or vertebral fractures. However, this patient is hemodynamically unstable with confirmed bleeding in the peritoneal cavity. The first priority in this patient is to address the source of bleeding and resolve the hypotension via laparotomy and surgical repair.

**(Choice 4)** A hemodynamically stable patient with intraperitoneal blood identified on ultrasound should undergo a CT scan of the abdomen with contrast. A CT scan allows the amount of intraperitoneal blood to be quantified and can often identify the site of injury. The surgeon can then select either laparotomy or admission and observation, based on the CT result.

**(Choice 5)** Diagnostic peritoneal lavage should be performed in any hemodynamically unstable patient with an equivocal or poor quality ultrasound exam.

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## 235. Question

**1 points**

### Category: Surgery

A 78-year-old man with Alzheimer's disease was brought to the ER because of bright red bleeding per rectum. He has chronic constipation and is being treated with bisacodyl. On admission, his temperature was 36.6 °C (97.9 °F), blood pressure was 130/80 mm Hg with no orthostatic change, pulse was 90/min and respirations were 14/min. Nasogastric tube drainage showed normal stomach contents without blood. His bleeding stopped a few hours after admission, and he remained hemodynamically stable during that time. Colonoscopy showed extensive diverticulosis but no active bleeding source. Later that night he started bleeding again, and he is now hypotensive with a BP of 100/70 mm Hg. Packed red cells and intravenous fluid are started. Which of the following is the most appropriate next step in management?

1. ☐ Upper gastrointestinal endoscopy
2. ☐ Capsule endoscopy
3. ☐ Barium enema
4. ☐ Labeled erythrocyte scintigraphy ☐
5. ☐ Laparotomy

**INCORRECT** ☐

**The correct answer is 4.**

The patient described is suffering hematochezia, which is defined as bright red blood in the stool. Hematochezia typically represents lower GI bleeding, but it may occur in cases of very brisk upper GI bleeding. The most common causes of acute lower GI bleeding in patients over 50 years old are diverticulosis, angiodysplasia and neoplasms. The patient described is most likely bleeding from one of his

diverticuli. Labeled erythrocyte scintigraphy (tagged RBC scan), although not a very specific study, can be helpful to identify the general site of bleeding after more direct tests such as colonoscopy fail to identify the site of bleeding. If the RBC scan identifies a bleed, it can be followed by angiography or repeat colonoscopy to identify and potentially treat the exact bleeding source.

**(Choice 1)** Hematochezia is more suggestive of lower rather than upper GI source of bleeding. Additionally, NG tube aspiration did not show blood so an upper GI source for the bleed is particularly unlikely.

**(Choice 2)** Capsule endoscopy is useful for patients with evidence of chronic GI blood loss but with negative upper and lower endoscopy. It is used to examine the small bowel.

**(Choice 3)** Barium enema would not give further information in this case as it is less informative than the colonoscopy the patient has already received.

**(Choice 5)** Laparotomy, for blind total abdominal colectomy and ileostomy, is reserved only for the situations where the bleeding is persistent and its site can't be found.

236. Question

1 points

**Category: Surgery**

A 34-year-old immigrant from Mexico presents following an episode of massive hemoptysis. He describes bringing up large amounts of bright red, foamy sputum. He denies any recent trauma. On physical examination, the patient is agitated and has difficulty speaking. His blood pressure is 100/60 mm Hg and his heart rate is 110/min. On physical examination, breath sounds are audible bilaterally. You immediately initiate intravenous infusion of crystalloid. Portable chest x-ray shows opacity in the right upper lobe. Which of the following is the best next step in the management of this patient?

1. ☐ Chest CT scan
2. ☐ Upper gastrointestinal endoscopy
3. ☐ Bronchoscopy ☐
4. ☐ Pulmonary arteriography with embolization
5. ☐ Immediate thoracotomy

**INCORRECT** ☐

**The correct answer is 3.**

This is a patient with massive nontraumatic hemoptysis. Massive hemoptysis is loosely defined as expectoration of more than 100 to 600 ml of blood in a 24-hour period. The greatest danger in massive hemoptysis is not exsanguination but rather asphyxiation due to airway flooding with blood. Bronchoscopy to localize and control the source of bleeding is the first step in managing massive hemoptysis. Rigid bronchoscopy has the additional benefit of providing good control of the airway. Given this patient's chest x-ray findings, *M. tuberculosis* infection is the most likely cause of his hemoptysis. Worldwide, pulmonary tuberculosis is one of the most common causes of massive hemoptysis. Mexico is an area where *M. tuberculosis* is endemic.

**(Choice 1)** Chest CT imaging may aid in the subsequent diagnostic work-up and therapeutic planning for this patient, but bronchoscopy offers the best immediate combination of diagnostic and therapeutic efficacy.

**(Choice 2)** When a patient produces blood from the mouth, it is important to determine if the source of the blood is the airway or the GI tract. Generally, blood from the airway has an alkaline pH and is bright red and frothy in appearance. Blood of GI origin is acidic, usually has a darker color, and may contain food particles.

**(Choice 4)** When the underlying cause of hemoptysis is a vascular lesion, such as an arteriovenous malformation, then pulmonary angiography and embolization might be necessary subsequent therapeutic steps.

**(Choice 5)** Immediate thoracotomy might be indicated if this patient had hemoptysis secondary to massive hemothorax following blunt or penetrating chest trauma.

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237. Question

1 points

**Category: Surgery**

An 18-year-old male comes to the physician's office because of dull aching and fullness of the scrotum. Examination shows soft testicular swelling; transillumination testing is negative. The scrotal swelling increases when the patient performs the Valsalva maneuver. The physical



examination is otherwise unremarkable. Which of the following is the most likely cause of his condition?

1. ☐ Hypoalbuminemia
2. ☐ Dilatation of pampiniform plexus ☐
3. ☐ Fluid in the tunica vaginalis
4. ☐ Testicular neoplasia
5. ☐ Cystic dilations of the efferent ductules

**INCORRECT** ☐

**The correct answer is 2.**

The patient described has a varicocele. A varicocele is a tortuous dilation of the pampiniform plexus of veins surrounding the spermatic cord and testis in the scrotum. A varicocele results from incompetence of the valves of the testicular vein and occurs most frequently on the left side, possibly because the left testicular vein enters the left renal vein inferiorly at a right angle thereby predisposing to impaired drainage. Patients are commonly asymptomatic. Those who do complain of symptoms may endorse a “dull” or “dragging” discomfort of the scrotum that is worse when standing. On examination, the affected side of the scrotum will feel similar to a “bag of worms” and the Valsalva maneuver will typically cause the mass to enlarge.

**(Choice 1)** Hypoalbuminemia may cause edema leading to fluid accumulation in dependent areas such as the legs and scrotum.

**(Choice 3)** Fluid in the tunica vaginalis is the cause of a hydrocele. Typically, hydroceles will transilluminate on physical examination. Communicating hydroceles are frequently reducible but may also increase in size with the Valsalva maneuver.

**(Choice 4)** Testicular neoplasia typically presents as a painless testicular mass though aching or acute pain may also occur. Examination typically discloses a firm, nontender mass that does not transilluminate.

**(Choice 5)** Cystic dilations of the efferent ductules (spermatocele) are painless fluid-filled cysts that contain sperm. They are located on the superior pole of the testis in relation to the epididymis. These masses are distinct from the testis and classically transilluminate.

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238. Question

1 points

**Category: Surgery**

A college student is tackled while playing football and develops severe knee pain. When examined shortly thereafter, the knee is swollen and the patient has pain on direct palpation over the lateral aspect of the knee. With the knee flexed 30 degrees, passive adduction elicits pain on the same

area, and the leg can be adducted further than in the normal contralateral leg (varus stress test). The anterior drawer test, posterior drawer test, and Lachman test are negative. Which of the following is the most likely site of injury?

1. ☐ Anterior cruciate ligament
2. ☐ Lateral collateral ligament ☐
3. ☐ Lateral meniscus
4. ☐ Medial collateral ligament
5. ☐ Posterior cruciate ligament

**INCORRECT** ☐

**The correct answer is 2.**

The lateral collateral ligament is the location of the pain on direct palpation, and the function of that ligament is to prevent the leg from being bent inward (adducted, assuming the varus position). The damage allows that motion to go beyond the normal limits. Incidentally, we can infer that he was hit from the inside, and the knee was forcefully bent outward.

**(Choice 1)** Anterior cruciate ligament injuries are manifested by the positive anterior drawer and Lachman test, which are negative in this case.

**(Choice 3)** Injuries to the meniscus produce limitations in the mobility of the knee and “catching” on loose intraarticular fragments.

**(Choice 4)** The medial collateral ligament is also a good candidate for tackling injuries when the blow is from the outside and the knee is forcefully bent inward; however, the findings on physical examination would be the exact opposite (mirror image) of those described here.

**(Choice 5)** Although anything can happen to the knees of football players, injuries to the posterior cruciate ligament are rare. When they do occur, the unstable knee shows a positive posterior drawer test (which was not present here).

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239. Question

1 points

**Category: Surgery**

A 25-year-old man is found on a pre-employment chest x-ray film to have a 3-cm peripheral coin lesion. The patient has never smoked, and a chest x-ray film that he had 2 years ago when he enrolled in graduate school had been normal. Prompted by this finding, he undergoes a more thorough physical examination, which discloses the presence of a firm, 2-cm testicular mass of which he was not previously aware. There are also palpable inguinal nodes on the same side. Which of the following is the most appropriate next step in management?

1. ☐ Supportive symptomatic palliative care
2. ☐ Bronchoscopy and biopsy of the lung mass
3. ☐ Trans-scrotal incisional biopsy of the testicular mass
4. ☐ Trans-scrotal orchiectomy and sampling of inguinal nodes
5. ☐ Radical orchiectomy by the inguinal route ☐

**INCORRECT** ☐

**The correct answer is 5.**

His age and status as a non-smoker make a primary testicular cancer with lung metastasis far more likely than the opposite combination, or the existence of two unrelated lesions. The fact that the tumor has spread should not preclude attempts at diagnosis and treatment, since most testicular cancers are exquisitely radio- and chemosensitive and may be cured even when they have metastasized. The correct way to diagnose a testicular cancer is by radical orchiectomy via the inguinal route.

**(Choice 1)** Palliative care only is often the best thing to do for far advanced, very aggressive tumors, for which there is no effective treatment anyway. This is not the case for testicular cancer. Do not give up in this case. Cure is still possible.

**(Choice 2)** Going after the metastasis first, rather than the assumed primary tumor, makes sense if the metastasis is more accessible, which is not the case here. Furthermore, bronchoscopy is not likely to provide access to a peripheral metastatic lesion.

**(Choices 3 & 4)** Urologists cringe at the thought of trans-scrotal approaches for testicular cancer, whether for biopsy or excision. The tumor is spread to the incision site, complicating further management. The only acceptable biopsy for a testicular mass is a formal orchiectomy by the inguinal route, with high ligation of the cord ("radical orchiectomy"),

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240. Question

1 points

**Category: Surgery**

An 88-year-old male complains of severe right calf pain several hours after undergoing a right femoral artery embolectomy. He also complains of a burning sensation in his posterior right leg. He has a long history of atrial fibrillation and hypertension. His past medical history also includes stroke, bleeding duodenal ulcer, diabetes mellitus and diabetic nephropathy. On physical examination, his blood pressure is 160/70 mm Hg and his heart rate is 100 per minute and irregular. His right calf is swollen, tense and exquisitely tender; the pain is worsened by passive extension of the right knee. Dorsalis pedis and posterior tibial pulses are palpable in the bilateral lower extremities. Which of the following is the most likely cause of this patient's symptoms?

1. ☐ Recurrent embolism
2. ☐ Venous thrombosis
3. ☐ Soft tissue swelling ☐
4. ☐ Bone infarction
5. ☐ Anaerobic infection

**INCORRECT** ☐

**The correct answer is 3.**

This patient presents with acute-onset severe calf pain and paresthesias hours after removal of an embolus from his right femoral artery. Given his history of bleeding duodenal ulcer and stroke, he is probably not being anticoagulated for his atrial fibrillation. In this setting, the embolus in his right femoral artery most likely arose from a mural thrombus in his fibrillating left atrium. With this background, the most likely cause of his signs and symptoms is ischemia-reperfusion syndrome, a form of compartment syndrome. Following more than 4 to 6 hours of ischemia, tissues can suffer both intracellular and interstitial edema upon reperfusion. When the extremities are involved, this creates a risk for compartment syndrome. Compartment syndrome is defined as increased pressure within an enclosed fascial space causing ischemia of muscles and nerves. In this case, the increased pressure is the result of acute edema within the muscular compartments of the leg. Compartment pressures in excess of 30 mm Hg indicate the presence of compartment syndrome and the need for emergent fasciotomy. Compartment syndrome most commonly affects the distal leg and forearm, and classically follows fracture or crush injuries. The most reliable indicators of early compartment syndrome include severe pain in the affected extremity that is out of proportion to the physical examination findings and pain that is exacerbated by passive stretch of the muscles in the affected compartment. The clinical findings in compartment syndrome can be remembered as the five "P1s":

- Pain is the earliest symptom. It is classically increased by passive stretch of the muscles in the affected compartment.
- Paresthesias (burning or tingling sensations) occur in the distribution of the affected peripheral nerve.
- Pallor of the overlying skin is the result of tense swelling and compromised perfusion.
- Pulselessness is a late finding. The presence of a pulse on exam does not rule out compartment syndrome.
- Paresis/paralysis is a late finding resulting from nerve and muscle ischemia and necrosis.

**(Choice 1)** Recurrent embolism causing recurrent ischemic pain is a possibility, but severe soft tissue swelling would be unusual for a recurrent embolus in the femoral artery.

**(Choice 2)** Deep venous thrombosis (DVT) may cause calf tenderness with pain worsened by passive stretching of the calf (Homan sign), but DVT is typically asymptomatic or associated with only vague, aching pain.

**(Choice 4)** Bone infarction has numerous potential etiologies. Frequently patients are asymptomatic; those with symptoms experience localized pain. Special cases, such as sickle cell anemia patients, present with severe pain during bouts of ischemia (“pain crises”).  
**(Choice 5)** An example of an anaerobic extremity infection is clostridial gas gangrene. On physical examination, skin necrosis, bullae, crepitus and signs of sepsis would be present.

241. Question

1 points

**Category: Surgery**

A 23-year-old male is found at the scene of a motor vehicle accident with bilateral lower extremity fractures. You also note extensive abdominal bruising and scalp lacerations. At the scene, the patient’s blood pressure is 80/60 mm Hg and his heart rate is 120/min. He is given 2 liters of IV fluids wide open. On the way to the hospital he becomes progressively drowsy, and he develops progressive weakness on the right side of his body. This patient is also likely to show deficits in the functioning of which of the following nerves?

1. ☐ Abducens
2. ☐ Oculomotor ☒
3. ☐ Glossopharyngeal
4. ☐ Trigeminal
5. ☐ Accessory

**INCORRECT** ☒

**The correct answer is 2.**

The nature of this patient’s accident and his scalp lacerations suggest that he has suffered blunt head trauma. After initial fluid resuscitation, he lapses into a state of decreased consciousness with right-sided hemiparesis. The most likely explanation in this setting is a transtentorial (uncal) herniation secondary to a right-sided epidural hematoma. Uncal herniation may also result from a subdural hematoma or an intracerebral mass. Epidural hematomas result from rupture of the middle meningeal artery. Because they are under arterial pressure, they expand rapidly. In this case, the fluid resuscitation likely increased the rate at which the hematoma expanded, thereby precipitating the above neurologic signs. Focal neurologic signs result from herniation of the parahippocampal uncus through the tentorial incisure, which causes pressure on the ipsilateral oculomotor nerve and posterior cerebral artery as well as compression of the contralateral cerebral peduncle against the edge of the tentorium. The specific lesions and their respective signs are described in the table below:

## TRANSTENTORIAL (UNCAL) HERNIATION

LESION	SIGNS
Compression of contralateral crus cerebri against the tentorial edge	Ipsilateral hemiparesis
Compression of the ipsilateral oculomotor nerve ( CN III) by the herniated uncus	Loss of parasympathetic innervation causes mydriasis (occurs early) Loss of motor innervation causes ptosis and “down and out” gaze of the ipsilateral pupil due to unopposed trochlear ( CN IV) and abducent ( CN VI) action (occurs late)
Compression of the ipsilateral posterior cerebral artery	Contralateral homonymous hemianopia
Compression of the reticular formation	Altered level of consciousness, coma

**(Choice 1)** The causes of abducent nerve (CN VI) injury are varied and include idiopathic, neoplastic compression, trauma, vasculopathy, aneurysmal compression, multiple sclerosis and, rarely, syphilis. Symptoms include strabismus and diplopia on lateral gaze.

**(Choice 3)** The glossopharyngeal nerve (CN IX) is most commonly injured by compression from a nearby tumor, as in jugular foramen syndrome (posterior fossa tumor). A glossopharyngeal nerve lesion would cause loss of the gag reflex, loss of taste and sensation on the posterior 1 /3 of the tongue, loss of pharyngeal sensation, and dysfunction of the carotid sinus reflex leading to an increased risk of syncope.

**(Choice 4)** Lesions of the trigeminal nerve may occur following injury to the brainstem at the pontine level, where this nerve originates, or to the medulla, where the spinal trigeminal nucleus and tract reside. Lesions can also occur outside of the brainstem, for example secondary to compression from a tumor or aneurysm.

**(Choice 5)** Lesions in the medulla, such as occlusion of the posterior inferior cerebellar artery, can cause accessory nerve (CN XI) dysfunction. The accessory nerve may also be injured during surgical procedures involving the anterolateral neck. Accessory nerve dysfunction causes paralysis of the ipsilateral sternocleidomastoid and trapezius muscles.

242. Question

1 points

**Category: Surgery**

A 54-year-old man comes to the physician because of edema of his right ankle. He reports heaviness and cramping in the same leg that is worse after a long day at work. The swelling is usually reduced significantly when he wakes up in the morning and worsens progressively



throughout the day. He denies any other symptoms. He has no significant medical problems except hypertension, for which he takes atenolol. His temperature is 36.7 °C (98 °F), blood pressure is 120/76 mm Hg, pulse is 80/min and respirations are 16/min. JVP is normal. Lungs are clear to auscultation. There are no murmurs. There is no hepatosplenomegaly. Examination shows edema of the right ankle. Doppler examination of the leg shows no evidence of thrombosis. Which of the following is the most likely cause of his edema?

1. ☐ Lymphatic obstruction
2. ☐ Impaired cardiac contraction
3. ☐ Reduced diastolic filling of the heart
4. ☐ Increased urinary loss of protein
5. ☒ Venous valve incompetence
6. ☐ Decreased liver protein synthesis

**INCORRECT** ☐

**The correct answer is 5.**

The patient described is experiencing unilateral lower extremity edema that worsens when the leg is dependent (i.e. while the patient is at work) and improves with leg elevation (i.e. when the patient is sleeping). There are many potential causes of lower extremity edema. Indeed, all of the above mentioned conditions may cause edema of the legs, but in the clinical scenario provided, venous valvular incompetence is the most likely cause. Venous insufficiency is the most common cause of lower extremity edema; it affects approximately 2% of the population at large. Failure of venous valves allows blood to pool in dependent areas such as the legs resulting in an increase in capillary hydrostatic pressure. This increased pressure favors increased filtration of fluid out of the capillaries into the interstitial tissue. This process causes a decrease in intravascular volume, which stimulates the kidneys to retain water and salt ultimately leading to further progression of edema.

**(Choice 1)** Lymphatic obstruction is an uncommon cause of edema. It may result from malignant obstruction of lymph nodes, lymph node resection, trauma and filariasis. It classically affects the dorsa of the feet and causes marked thickening and rigidity of the skin.

**(Choices 2 & 3)** Impaired cardiac contraction and reduced diastolic filling of the heart may cause bilateral lower extremity edema due to pooling of blood in the venous circulation causing increased capillary hydrostatic pressure. However, respiratory symptoms and crackles on examination are common.

**(Choices 4 & 6)** Increased urinary loss of protein and decreased liver protein synthesis causes decreased plasma oncotic pressure, which results in decreased reabsorption of interstitial fluid in distal capillaries and edema. Urinary protein loss occurs in nephrotic syndromes as well as in most cases of nephritis. Failure of liver protein synthesis typically occurs in the setting of cirrhosis or other forms of liver failure where the synthetic function of the liver is impaired. Other signs of liver failure and nephrotic syndrome are usually evident.



243. Question

1 points

Category: Surgery

A 35-year-old woman is being evaluated after having a screening mammography. A 3 x 3 cm spiculated mass with coarse calcifications is seen in the upper outer quadrant of her right breast. She has no complaints. She has a history of bilateral reduction mammoplasty for mammary hyperplasia 12 years ago. She has no family history of medical problems. Breast examination shows her right nipple is slightly retracted. A fixed mass is palpated in the upper outer quadrant of the right breast. Ultrasonography of the breast shows a hypoechoic mass. Multiple core biopsy samples show foamy macrophages and fat globules. Which of the following is the most appropriate course of action?

1. ☒ Instruction for regular clinical breast examination and follow-up mammography ☐
2. ☐ Radiation therapy of the right breast
3. ☐ MRI of the breast
4. ☐ Simple mastectomy
5. ☐ Segmental excision and axillary node dissection followed by radiation therapy

**INCORRECT** ☐

**The correct answer is 1.**

This patient has fat necrosis of the breast. This uncommon condition is associated with breast trauma or surgery though frequently the patient cannot recall a history of trauma. Fat necrosis can mimic breast cancer in its clinical and radiographic presentation as it commonly presents as a fixed mass with skin or nipple retraction has evidence of calcification on mammography and appears solid on ultrasonography. The calcifications seen in breast malignancy tend, however, to be microcalcifications while the calcifications seen in benign conditions such as fat necrosis tend to be coarse. Excisional, core or fine needle biopsy is diagnostic and typically shows fat globules and foamy histiocytes. Fat necrosis is not a premalignant lesion and will resolve with time. Standard follow-up consisting of monthly self-examinations, annual clinical examinations and routine screening mammography starting at age 40 is sufficient.

**(Choices 2,4 & 5)** Radiation and surgery are not indicated for this biopsy-proven nonmalignant condition. These interventions should be reserved for malignant breast disease.

**(Choice 3)** Further imaging of the affected breast is not necessary as a tissue diagnosis has been obtained.

## 244. Question

1 points

## Category: Surgery

An 18-year-old female is seen in the ED with a 1-day history of abdominal pain. The patient states that the pain began periumbilically as a dull ache, but it has since migrated to the right lower quadrant. It is now sharp and constant in nature. This morning, the patient began vomiting and had one episode of diarrhea. She is sexually active and her last menstrual period ended 7 days ago. On exam, she is ill appearing and tachycardic. There is involuntary guarding in both quadrants of the lower abdomen. A pelvic exam reveals tenderness noted upon movement of the cervix and during rectal exam. A CBC demonstrates a leukocytosis of 13,000, and  $\beta$ -hCG is negative. In order of decreasing frequency, what are the potential causes of appendicitis in this patient?

1. ☐ Foreign body, tumor, fecalith
2. ☐ Tumor, fecalith, lymphoid hyperplasia
3. ☐ Fecalith, lymphoid hyperplasia, tumor
4. ☐ Lymphoid hyperplasia, fecalith, tumor ☐
5. ☐ Fecalith, tumor, lymphoid hyperplasia

INCORRECT ☐**The correct answer is 4.**

All of the choices listed are causes of appendiceal lumen obstruction that cause appendicitis, with the proper order of incidence being lymphoid hyperplasia, fecalith, and tumor. Sixty percent of cases are caused by lymphoid hyperplasia, with peak incidence occurring in the teenage years. The hyperplasia leads to venous obstruction, followed by arterial insufficiency and ischemic necrosis of the appendix, which causes the pain to become localized to the right lower quadrant. Fecaliths are identified in 20% to 30% of appendicitis cases and are more commonly seen in adults. They can sometimes be identified in the right lower quadrant on abdominal plain films or on CT scans, and they need to be removed with the appendix at the time of surgery. The most common appendiceal tumor is a carcinoid. These uncommon tumors are usually located in the tip of the appendix and are unlikely to cause acute appendicitis.

**(Choice 1)** Foreign bodies, such as seeds, can result in luminal obstruction leading to appendicitis. This is rare, however.

**(Choice 2, 3 & 5)** These options are all causes of appendiceal lumen obstruction, but are not arranged in the correct order of frequency.

## 245. Question

1 points

## Category: Surgery

A 45-year-old man went skiing in Aspen, Colorado, and met with an unfortunate accident, following which he was airlifted to a hospital. He had a swollen left thigh, after having bled into it. An x-ray revealed multiple fractures of the left femur. He was transfused with blood and underwent emergency reduction and internal fixation of the fractures. Following surgery, he was transferred to the intensive care unit, and a few days later, to a step-down unit. Unfortunately, the patient developed a pulmonary embolus, which was successfully treated. The most common early presentation of a pulmonary embolus is which one of the following?

1. ☐ Swelling of the calf
2. ☐ Calf tenderness
3. ☐ Chest pain on deep inspiration
4. ☐ Fever
5. ☐ Increased pulse rate ☐

INCORRECT ☐**The correct answer is 5.**

Sinus tachycardia, which will increase the pulse rate, is the most common presentation of a pulmonary embolus. In a patient such as this, who is at risk for pulmonary embolus, unexplained tachycardia should always lead one to suspect the possibility of pulmonary embolus and should be investigated more thoroughly.

**(Choice 1)** indicates the presence of a possible deep venous thrombus, which can lead to a pulmonary embolus if it is not preempted from doing so.

**(Choice 2)**, also known as Homan's sign, is an indicator of deep venous thrombosis but it is not very reliable. It is important to note that choices A and B are features of deep venous thrombosis and not primary features of pulmonary embolus per se, which this question is all about.

**(Choice 3)** is pleuritic in origin. It is certainly seen in pulmonary embolus, but may well be absent. However, it is not the earliest feature, nor is tachypnea and cough with hemoptysis, which also can be present.

**(Choice 4)** develops later and may be low-grade.

## 246. Question

1 points

## Category: Surgery

A 45-year-old woman with breast cancer undergoes a modified radical mastectomy with lymph node dissection. Six weeks later, she returns complaining of decreased mobility of her shoulder. On physical examination, the scapula protrudes from the body when pressing her outstretched arm on the wall. Which of the following nerves was most likely injured during the operation?

1. ☐ Intercostal
2. ☐ Lateral pectoral
3. ☐ Long thoracic ☐
4. ☐ Medial pectoral
5. ☐ Thoracodorsal

**INCORRECT** ☐

**The correct answer is 3.**

This patient has scapular “winging,” a protrusion of the scapula when the ipsilateral outstretched arm is pressed against a wall. Scapular winging results from paralysis of the serratus anterior muscle, which functions to carry the scapula forward and assist the deltoid in raising the arm. The serratus is innervated by the long thoracic nerve, which is derived from the fifth, sixth, and seventh cervical nerve roots. This woman had an axillary lymph node dissection that may have damaged the inferior part of the brachial plexus, leading to long thoracic nerve damage, paralysis of the serratus, and scapular winging.

**(Choice 1)** The intercostal nerves arise from the thoracic nerve roots and innervate the intercostal muscles of the chest wall.

**(Choices 2 & 4)** The lateral pectoral and medial pectoral nerves innervate the pectoralis major and minor muscles.

**(Choice 5)** The thoracodorsal nerve innervates the latissimus dorsi muscle.

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## 247. Question

**1 points**

### Category: Surgery

A 46-year-old man comes to the physician because of a two day history of worsening abdominal discomfort and persistent vomiting. He has not had a bowel movement or passed flatus for 3 days. He had an appendectomy for appendicitis 20 years ago. Examination shows a distended abdomen that is tympanic on percussion. High-pitched bowel sounds and splashing are heard on auscultation. The abdomen is diffusely tender on palpation without rebound or guarding. An x-ray film of the abdomen shows distended small bowel loops with air-fluid levels; no gas is seen in the colon. IV rehydration is started. Which of the following is the most appropriate next step in management?

1. ☐ Emergency laparotomy
2. ☐ Barium enema under fluoroscopic control
3. ☐ Nasogastric suction and intravenous fluids ☐
4. ☐ Administer bethanechol
5. ☐ Start total parenteral nutrition

**INCORRECT** ☐

**The correct answer is 3.**

The patient described has a complete mechanical small bowel obstruction most likely due to intraabdominal adhesions from his prior surgery for appendicitis. Findings on history and physical that support this diagnosis include nausea and vomiting, failure to pass stool or flatus for 3 days, and hyperactive “tinkling” bowel sounds. The X-ray confirms the diagnosis by identifying dilated loops of small bowel with air-fluid levels with an absence of gas in the colon. The immediate treatment for complete small bowel obstruction is intravenous fluids and electrolyte replacement, NPO and placement of a nasogastric tube to decompress the stomach, prevent aspiration and prevent further abdominal distention. Surgery will likely be necessary for any case of complete small bowel obstruction in order to prevent strangulation, but proper preparation for surgery with the aforementioned measures is essential. Partial small bowel obstruction, where the patient is still able to pass small amounts of stool or flatus, may be managed expectantly with supportive measures and observation alone.

**(Choice 1)** While laparotomy may be required for complete small bowel obstruction, such a procedure should not be done emergently unless strangulation or perforation of the bowel is likely. Preparation for surgery with fluid and electrolyte replacement and gastric decompression will make the patient a better surgical candidate.

**(Choice 2)** Sigmoid volvulus can be addressed with barium enema with controlled pressure under fluoroscopic control. This patient has x-ray findings of a small bowel obstruction, which would not benefit from an enema.

**(Choice 4)** Bethanechol is sometimes used for paralytic ileus but not for obstruction. High-pitched bowel sounds indicate bowel obstruction; decreased or absent bowel sounds occur with an ileus.

**(Choice 5)** Total parenteral nutrition is not indicated in the initial treatment of small bowel obstruction. Prolonged NPO status may require TPN at a later time.

A 21-year-old female military recruit presented to the physician's office because of pain in her right foot. The pain started a few weeks ago and initially only occurred with activity, but now the pain is present even at rest. She has no history of obvious trauma. Examination shows swelling and warmth in the foot and point tenderness over the second metatarsal. Plain films of the foot show a hairline fracture of the shaft of the second metatarsal. Which of the following is the most appropriate next step in management?

1. ☐ Bone scan
2. ☐ MRI of the foot
3. ☐ Rest and analgesics ☒
4. ☐ Plaster cast
5. ☐ Surgical intervention

**INCORRECT** ☐

**The correct answer is 3.**

The patient described has a nondisplaced hairline (stress) fracture of the second metatarsal. Metatarsal stress fractures typically occur in athletes and military recruits, particularly due to the sudden and drastic increase in activity by the latter. The second metatarsal, which is subjected to significant extremes of loading during gait, is the most commonly involved metatarsal. Patients present complaining of slow onset foot pain that initially only occurs with activity but later is present during rest as well. Point tenderness over the affected metatarsal is present on examination. Fractures of the second, third and fourth metatarsals are managed conservatively because the surrounding metatarsals act as splints and nonunion is uncommon. Rest and pain control are the most appropriate treatments in this case. Patients may additionally be managed with a hard-sole shoe and light activity may be resumed immediately.

**(Choices 1 & 2)** Bone scan and MRI of the foot may be used to make the diagnosis of a metatarsal stress fracture if plain radiographs are unable to demonstrate the fracture. The patient described already has radiographic evidence of a fracture; additional imaging studies are unnecessary.

**(Choice 4)** Plaster casting is used for patients with persistent pain following more conservative treatment as detailed above.

**(Choice 5)** Surgical intervention is reserved for fractures of the fifth metatarsal, such as Jones fractures, or for displaced fractures not amenable to closed reduction.

A 3-year-old girl is brought to the emergency department because she is not moving her right arm. Her mother states that the child was perfectly normal in the morning. She remembers that she lifted the child with the child's right forearm and since then she has not been moving her right arm. Examination shows the right arm is held in pronation against the chest. The child avoids any movement of her right arm. Which of the following is the most appropriate next step in management?

1. ☐ Refer the child to an orthopedic surgeon for possible supracondylar fracture of humerus
2. ☐ Report the case to child protection agency
3. ☐ Gentle passive elbow flexion and forearm supination ☐
4. ☐ Closed reduction and casting of forearm and arm
5. ☐ Do a skeletal survey of the child

**INCORRECT** ☐

**The correct answer is 3.**

Nursemaid elbow is a common injury among preschool children. It refers to subluxation of head of radius at elbow joint. The injury can occur innocently from swinging a young child by the arms or pulling a child's arm while in a hurry. The child is usually not in distress at presentation but would cry at any attempt to flex the elbow or supinate the forearm.

Diagnosis is made clinically as radiographs are often normal.

Treatment of this condition is closed reduction in following steps:

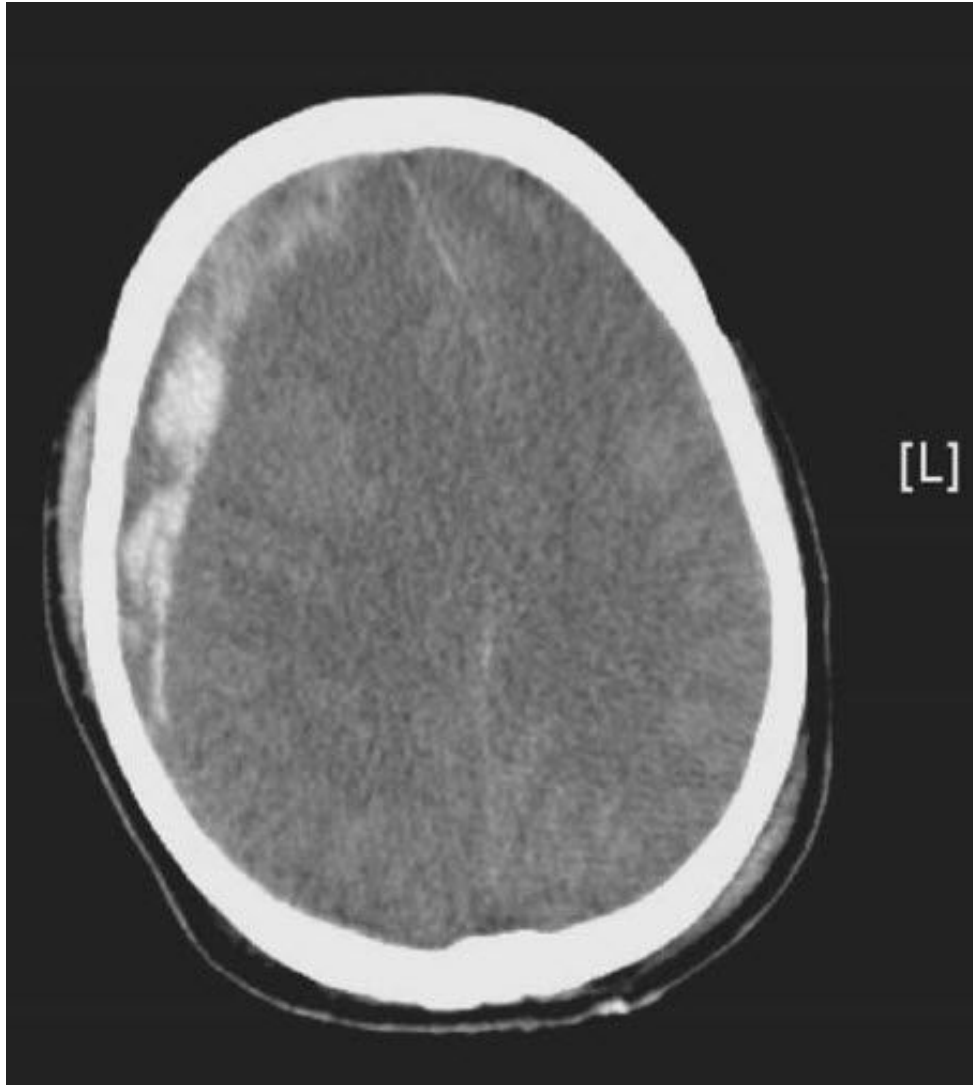
- First extend and distract the elbow.
- Next supinate the forearm.
- Hyper flex the elbow with your thumb over the radial head in order to feel the reduction as it occurs.
- No post reduction films are needed, since success is usually demonstrated by the infant who has resumed the use of previously unused extremity.

**(Choices 1 & 4)** are not needed, as this is a temporary condition without permanent effect.

**(Choices 2 & 5)** are not needed, as subluxation of radial head is a very common injury in preschool children, which is most commonly accidental. Also, the clinical presentation of this patient is not suggestive of any child abuse.



A 45-year-old male skier is brought to the emergency room by helicopter after being struck by an out-of-control snowboarder. Initially the patient was dazed and confused but these symptoms quickly resolved and he continued to ski to the lodge. The patient's wife noticed that he was acting strangely, so she took him to the clinic at the resort. From there, he was transported to the hospital. On exam, the patient has a GCS of 14, and he demonstrates some confusion, perseveration, and a slightly dilated right pupil. The patient is taken for a CT scan. What is the etiology of this patient's current condition?



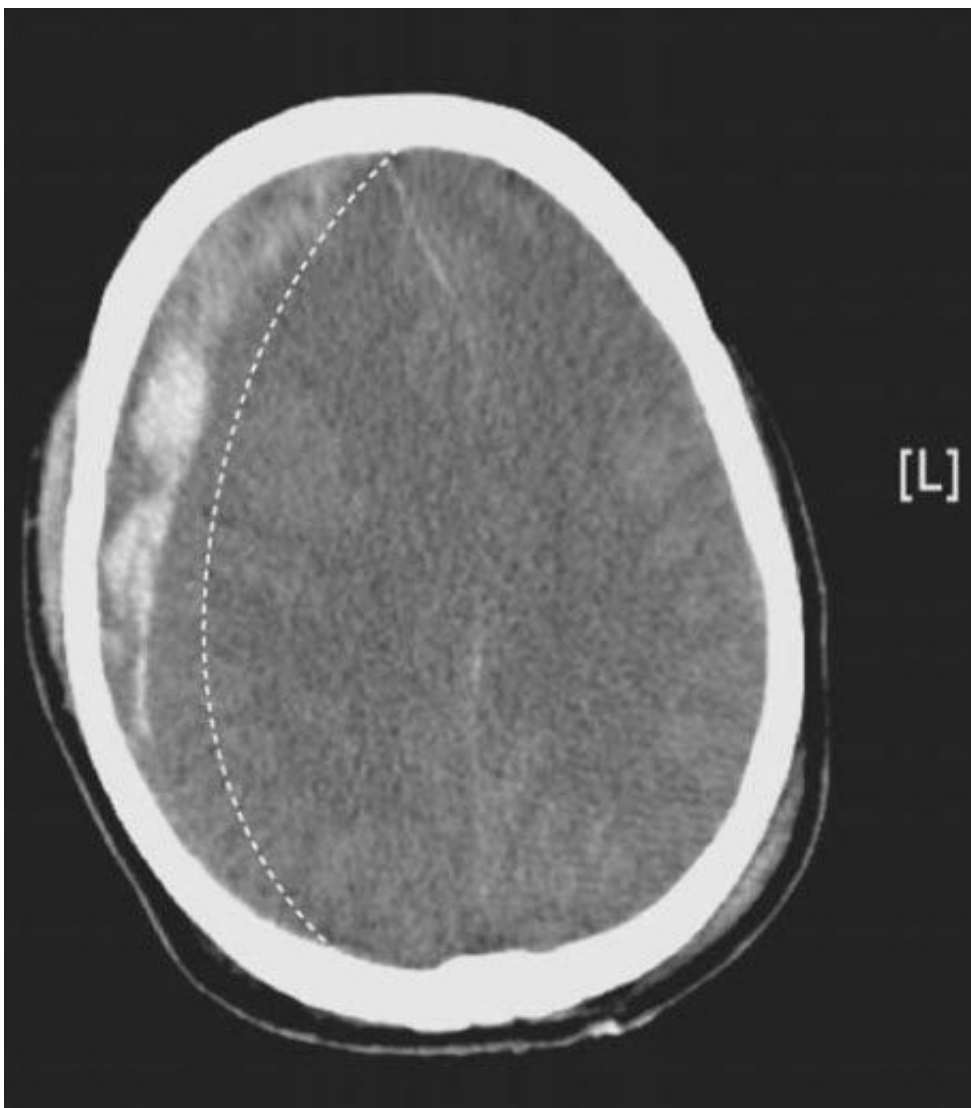
1. ☐ Subdural hematoma ☒
2. ☐ Epidural hematoma
3. ☐ Subarachnoid hemorrhage
4. ☐ Intraparenchymal hemorrhage
5. ☐ Axonal shear injury

INCORRECT ☐

**The correct answer is 1.**

Transection of the cerebral veins as they enter the superior sagittal sinus is the most common cause of a traumatic subdural hematoma. Blood collects below the dura and above the subarachnoid membranes. Initially, the bleeding is not enough to cause noticeable symptoms. As the hematoma increases in size, however, the underlying brain becomes compressed, causing symptoms of increased intracranial pressure. The CT in the image (note marked area) shows a concave-shaped hematoma on the right, which is displacing the brain to the left.

**(Choice 2)** Epidural hematomas are usually the result of blunt trauma to the head leading to arterial bleeding from the middle meningeal artery. They are often associated with a temporal skull fractures. The patient typically experiences a brief loss of consciousness, which is followed by several hours of lucid behavior, and then by a rapid decline in consciousness. Diagnosis is made by CT scan of the head, demonstrating a convex-shaped hematoma with or without mass effect.



**(Choice 3)** A subarachnoid hemorrhage usually occurs due to rupture of a cerebral aneurysm.

**(Choice 4)** Intraparenchymal hemorrhage presents with blood within the brain parenchyma. The CT scan shown here is not consistent with an intraparenchymal bleed.

**(Choice 5)** Axonal shear injury occurs with angular acceleration–deceleration injuries. Shearing of deep white matter tracts leaves the patient with a very low GCS and poor prognostic outcome. An MRI is the most useful radiographic modality to delineate areas of

shear injury.

## 251. Question

1 points

### Category: Surgery

A man involved in a high-speed, head-on automobile collision arrives at the emergency department in a deep coma. His pupils react poorly to light but are of equal size. An airway is placed, and the patient is sent for CT scan of the head with extension to the neck. The study shows no cervical spine fractures, but does reveal a small, crescent-shaped hematoma on the right side, with no deviation of the midline structures. Which of the following is the most appropriate next step in management?

1. ☐ High-dose steroids
2. ☒ Hyperventilation, diuretics, and fluid restriction ☐
3. ☐ Systemic vasodilators and alpha blockers
4. ☐ Surgical evacuation of his epidural hematoma
5. ☐ Surgical evacuation of his subdural hematoma

**INCORRECT** ☐

**The correct answer is 2.**

A crescent-shaped hematoma is seen in acute subdural hematoma, whereas acute epidural hematoma produces a biconvex, lens-shaped collection. The diagnosis is therefore acute subdural hematoma, but the hematoma is not displacing structures, either clinically (pupils are of equal size) or radiologically. Evacuation is not a priority. The neurologic damage resulted from the initial blow and could be compounded by a subsequent increase in intracranial pressure. Therapy should therefore be directed at preventing such an increase, i.e., hyperventilation, diuretics, and fluid restriction.

**(Choice 1)** Immediate administration of high-dose steroids may result in a better long-term outcome in spinal cord injuries. Steroids also lower the elevated intracranial pressure caused by brain tumors; however, for reasons that we do not understand, these agents do not do so in cases of increased intracranial pressure caused by trauma.

**(Choice 3)** Vasodilators would increase intracranial pressure, whereas alpha blockers would produce systemic hypotension and further reduce brain perfusion.

**(Choice 4)** The patient does not have an epidural hematoma as evidenced by the lack of a biconvex, lens shaped collection on CT.

**(Choice 5)** Surgical evacuation of his subdural hematoma is not indicated if no damage has been caused by the hematoma, since there is no midline shift or anisocoria (inequality of pupils).

252. Question

1 points

**Category: Surgery**

A 28-year-old female is ejected from her car after it is struck from the side by a car traveling approximately 50 mph. At the accident scene, her initial GCS is 10. The patient was intubated by the paramedic for respiratory distress and is brought to the emergency department in critical condition. The paramedic reports that the patient's blood pressure has been slowly falling during transport. The last pressure was 64/40 with a heart rate of 133 and an oxygen saturation rate of 62%. You notice obvious deformities of multiple ribs of the left chest. You determine that the patient needs a left thoracostomy tube. After placement, the chest x-ray shown in the image is obtained. What injury does this patient have?



1. ☐ Pulmonary laceration
2. ☐ Aortic dissection
3. ☐ Ruptured diaphragm ☐
4. ☐ Gastric perforation
5. ☐ Cardiac contusion

**INCORRECT** ☐

**The correct answer is 3.**

The chest x-ray above clearly demonstrates a nasogastric tube that is in the stomach and located above the normal level of the diaphragm. This finding is consistent with a diaphragmatic rupture. Image below is a CT scan that shows the stomach in the left chest, which is also consistent with a diaphragmatic rupture. Diaphragmatic rupture is a severe injury, and one that is seen most often with blunt trauma. The diagnosis is usually and easily made with a chest x-ray, with the bowel seen within the chest. The left hemidiaphragm is injured more often, as the liver is thought to offer some protection to the right hemidiaphragm.



**(Choice 1)** Pulmonary laceration is difficult to diagnose via chest x-ray alone. It would present with lung density due to parenchymal bleeding.

**(Choice 2)** Aortic dissection would show a widened mediastinum on chest x-ray in a hemodynamically labile patient.

**(Choice 4)** A gastric perforation should show free air on chest x-ray.

**(Choice 5)** A cardiac contusion would not be seen on chest x-ray.

253. Question

1 points

**Category: Surgery**

A 36-year-old woman is brought to the emergency department after she jumped from the second floor of a burning building. On arrival examination shows an unconscious woman with blood coming from her nose and with an open tibial fracture of left leg. Her eyes are closed and her pupils are equal and responsive bilaterally. She makes muffled sounds and responds to pain by opening the eyes and moving all the limbs. After the initial resuscitation, which of the following is the most appropriate next step in management?

1. ☐ CT scan of head
2. ☐ X-ray of left leg

- 3. ☐ X-ray of spine ☐
- 4. ☐ Lumbar puncture
- 5. ☐ X-ray of head

**INCORRECT** ☐

**The correct answer is 3.**

Approximately 5-10% of unconscious patients who present to the ED as the result of a motor vehicle accident or fall, have a major injury to the cervical spine. One third of injuries occur at the level of C2, and one half of the rest occur at the level of C6 or C7. Most fatal cervical spine injuries occur in upper cervical levels, either at craniocervical junction, C1 or C2. This patient had head trauma as evidenced by nature of her injury and epistaxis. Patient with head trauma can have coexisting cervical spine injury, which should always be assessed before mobilizing the patient. Clinical evaluation of the cervical spine in a patient with blunt trauma is unreliable. Because of grave consequences of missing a cervical spine injury, it is important to rule out a fracture or dislocation of cervical spine as the first priority. In the Emergency room this can be done best with a lateral view x-ray of spine. It is 85-90% sensitive in diagnosing cervical spine injury. At the site of accident, when cervical spine injury is suspected, the patient should be transported with the neck stabilized with a collar. Tenderness on palpation of cervical spine is indicative of a spine injury.

**(Choice 1)** This patient has epistaxis suggestive of fracture of base of skull. However, a CT scan is indicated only after cervical spine injury is ruled out and patient is stable. An alternative could be to do a CT scan of head including the neck.

**(Choice 2)** Though the patient has an obvious fracture of her left tibia, cervical spine injury is potentially more dangerous and should be ruled out before looking for trauma to other body parts.

**(Choice 4)** Lumbar puncture has no significant role in assessment of head trauma and is rather contraindicated in head injury unless a CT scan rules out intracranial hypertension.

**(Choice 5)** X-ray of head gives very little useful information and CT scan of head is a better alternative to assess head injury.

## 254. Question

1 points

### Category: Surgery

A 35-year-old previously healthy male comes to the emergency department because of a 4-hour history of severe abdominal pain. The pain had initially started in the periumbilical area but has now shifted to the right lower quadrant. He also felt nauseated and vomited twice. He has had no previous surgeries. His temperature is 38.9 °C ( 102 °F), blood pressure is 125/80 mm Hg, pulse is 100/min and respirations are 20/min. Examination shows tenderness in the right lower quadrant. Palpation of the left lower quadrant produces pain in the right lower quadrant. Urinalysis is negative. Which of the following is the most appropriate next step in management?



1. ☐ Ultrasound of the abdomen
2. ☐ CT scan of the abdomen
3. ☐ Conservative management
4. ☐ Immediate surgery ☐
5. ☐ Colonoscopy

**INCORRECT** ☐

**The correct answer is 4.**

This patient has classic signs and symptoms of appendicitis. The pain of appendicitis typically begins as dull, vague periumbilical pain consistent with midgut visceral pain due to stretching of the appendiceal wall. As inflammation of the peritoneum in the right lower quadrant (RLQ) ensues, the pain localizes to that region and becomes sharp in quality. At this time pain is elicited upon palpation of McBurney's point in the RLQ, and RLQ pain can be reproduced upon deep palpation of the left lower quadrant (Rovsing's sign). Appendicitis is a clinical diagnosis. Patients with a classic presentation of appendicitis should be operated on immediately to remove the inflamed appendix and prevent appendiceal rupture.

**(Choice 1)** Ultrasound of the abdomen when appendicitis is suspected is utilized in women in whom other pathology, such as an ovarian process, may be the cause of disease. Ultrasound is also used in patients who are pregnant.

**(Choice 2)** CT scan of the abdomen is used in nonpregnant patients to confirm the diagnosis if the presentation is atypical.

**(Choice 3)** Conservative management with delayed appendectomy is employed in patients in whom an abscess of phlegmon has occurred. The focus of infection is treated with intravenous antibiotics and bowel rest is employed. The appendix is ultimately removed weeks later.

255. Question

1 points

**Category: Surgery**

A 48-year-old man with postnecrotic cirrhosis due to chronic hepatitis B requires surgery to reduce portal venous pressures. If the surgeon decides to use a shunt that reduces the risk for developing hepatic encephalopathy, the most likely shunt is which one of the following?

1. ☐ Mesocaval
2. ☐ Side-to-side portacaval



- 3. ☐ End-to-side portacaval
- 4. ☐ Distal splenorenal ☐
- 5. ☐ Mesosplenal

**INCORRECT** ☐

**The correct answer is 4.**

The surgical treatment for portal hypertension encompasses a variety of shunt operations. Shunt types include a portocaval shunt, mesocaval shunt, and the distal splenorenal shunt. Since the portal vein is formed by the superior mesenteric vein and the splenic vein, a distal splenorenal shunt reduces portal vein pressure (splenic vein blood is shunted into the renal vein) without bypassing the liver. Therefore, portal vein blood containing ammonia produced by colon bacteria is partially metabolized in the liver by the urea cycle; this reduces the risk for inducing hepatic encephalopathy. In contradistinction, portosystemic shunts reduce portal pressure but deprive the liver of portal blood flow, thus exacerbating hepatic encephalopathy by increasing serum ammonia levels.

**(Choice 1)** Mesocaval shunts are anastomoses between the superior mesenteric vein and vena cava, the portal vein and vena cava, and the mesenteric vein and renal vein. These are most often performed as an emergency procedure for active esophageal bleeding that is resistant to therapy. In general, these shunts decompress esophageal veins, control ascites, and have a high rate of patency.

**(Choices 2 & 3)** The side-to-side (portal vein–inferior vena cava) and the end-to-side (portal vein–inferior vena cava) shunts decompress sinusoidal pressure in the liver and relieve ascites in most patients by redirecting portal vein blood into the vena cava.

**(Choice 5)** A mesosplenal shunt is sheer nonsense.

256. Question

1 points

**Category: Surgery**

A 45-year-old man is brought to the emergency department after being involved in a motor vehicle collision. He is unable to void. Examination shows blood at the urethral meatus and a scrotal hematoma. His temperature is 37 °C (98.6 °F), blood pressure is 100/50, pulse is 100/min and respirations are 16/min. Examination shows a high-riding prostate with no other signs of trauma. Which of the following is the most appropriate next step in management?

- 1. ☐ Immediate surgical repair of urethra
- 2. ☐ Foley catheterization
- 3. ☐ Retrograde urethrogram ☐

- 4. ☐ Diuretic to increase the urine output
- 5. ☐ Retrograde cystogram with post-void films

**INCORRECT** ☐

**The correct answer is 3.**

Classic signs of posterior urethral injury include blood at the urethral meatus, inability to void and a high-riding prostate on digital rectal examination. Perineal or scrotal hematomas are also frequently seen and such an injury is most classically associated with a pelvic fracture. When a urethral injury is suspected clinically, the urethra should be assessed with a retrograde urethrogram prior to insertion of a Foley catheter. The procedure can be used both to determine whether damage to the urethra has occurred and to determine the location of such damage within the urethra. Blind insertion of a Foley catheter is contraindicated in patients suspected of having a urethral injury because it can cause infection of a periurethral hematoma and can increase the severity of the urethral tear. **(Choice 1)** An immediate surgical repair is occasionally done in cases of anterior urethral injury. Most cases of urethral injury are treated with urinary diversion via a suprapubic catheter while the primary injury and associated hematomas are allowed to heal. After healing is complete, residual damage, such as urethral stricture, is assessed and repaired.

**(Choice 2)** One should never attempt to pass a Foley catheter in a patient with a suspected urethral injury as it can cause seeding of periurethral or perivesical hematomas and can convert a partial urethral laceration into a complete laceration.

**(Choice 4)** The failure to void in this patient's case is not a result of failure to produce an adequate volume of urine. In this setting, diuretics would only worsen the patient's distress.

**(Choice 5)** A retrograde cystogram with post void films is used for diagnosis of bladder injury. Bladder injury may occur following major trauma, especially pelvic fracture. Patients typically complain of gross hematuria.

## 257. Question

1 points

### Category: Surgery

A 54-year-old female with a 30 pack-year smoking history undergoes cholecystectomy after an episode of biliary pancreatitis. On the third postoperative day, she complains of discomfort in the upper abdomen. Though she is breathing comfortably, her oxygen saturation is 90%, compared with 98% yesterday. Her blood pressure is 130/80 mm Hg, heart rate is 90/min, respiratory rate is 20/min, and temperature is 98°F (36.7°C). Arterial blood gas analysis reveals the following:

pH = 7.44

pO<sub>2</sub> = 64 mmHg

pCO<sub>2</sub> = 34 mmHg

Which of the following most likely explains the observed findings?

1. ☐ Aspiration of gastric secretions
2. ☐ Impaired cough and deep breathing ☐
3. ☐ Bronchial wall edema and bronchospasm
4. ☐ Diaphragmatic paralysis
5. ☐ Ventilator-associated pneumonia

**INCORRECT** ☐

**The correct answer is 2.**

This patient has developed a drop in her oxygen saturation, and blood gas analysis reveals hypoxemia with a borderline low  $p\text{CO}_2$ . Her vital signs are otherwise normal, and she appears comfortable. Thus, the most likely cause of her hypoxemia is post-operative atelectasis. Atelectasis is one of the most common postoperative pulmonary complications, and is particularly common after abdominal and thoracoabdominal surgery. Following such surgeries, pain and changes in lung compliance can cause impaired cough and deep breathing. Shallow inhalations limit recruitment of alveoli at the lung bases and weak cough predisposes to small airway mucus plugging. Adequate pain control and use of incentive spirometry decrease the incidence of post-operative atelectasis by promoting lung expansion.

**(Choice 1)** General anesthesia impairs laryngeal defenses, predisposing to aspiration of gastric contents. Signs and symptoms of aspiration generally manifest within hours of surgery, and include dyspnea, cough, wheeze, hypoxemia, and tachypnea.

**(Choice 3)** Bronchospasm is common in the post-operative period, particularly in patients with underlying COPD or asthma. Wheezing and dyspnea would be expected in addition to hypoxemia.

**(Choice 4)** Diaphragmatic paralysis may occur as a consequence of phrenic nerve injury from thoracic surgery, cervical manipulation, or tumor compression but is less likely during abdominal surgery. Unilateral diaphragmatic paralysis is often asymptomatic, while bilateral diaphragmatic paralysis causes hypoxemia, rapid shallow breathing, orthopnea, and even respiratory failure.

**(Choice 5)** Ventilator associated pneumonia (VAP) may occur in patients who are on assisted ventilation for >48 hours, and is a result of impairments in the lung's natural defenses. Fever and hypoxia are common, and *Pseudomonas* infection must be considered. This patient has not been ventilated >48 hours and is afebrile, making this diagnosis unlikely.

A 20-year-old man is stabbed in the left side of his chest, medial to the nipple. Upon examination, his blood pressure is 90/60 mm Hg and his pulse is 130/min. His jugular venous pulse increases on inspiration, whereas his peripheral pulse and blood pressure decrease on inspiration. Breath sounds are normal bilaterally. The patient's chest x-ray film is unremarkable. After receiving 2 L of isotonic saline, his blood pressure remains low, whereas his central venous pressure rises to 32 cm H<sub>2</sub>O. Which of the following is the most appropriate next step in the management of this patient?

1. ☐ Insert a chest tube into the left pleural cavity.
2. ☐ Increase parenteral fluids until the blood pressure increases.
3. ☐ Order an echocardiogram. ☐
4. ☐ Decrease venous pressure by administering a venodilator.
5. ☐ Decrease venous pressure by administering a loop diuretic.

**INCORRECT** ☐

**The correct answer is 3.**

Cardiac tamponade is characterized by decreased cardiac output and increased central venous pressure owing to restriction of blood flow into and out of the heart as fluid in the pericardial sac restricts filling of all the cardiac chambers. An echocardiogram is the most sensitive and specific noninvasive test to establish the presence of fluid in the pericardial sac. After the diagnosis is established, pericardiocentesis should be performed to immediately reduce intrapericardial sac pressure. Surgery follows to locate the source of the tamponade in those cases that are associated with trauma. Distention of the neck veins on inspiration is called Kussmaul's sign. Normally, the increase in negative intrathoracic pressure on inspiration sucks blood from the jugular venous system into the right side of the heart. However, if the right side of the heart is restricted by fluid in the pericardial sac, the blood regurgitates into the jugular veins on inspiration.

**(Choice 2)** A drop in the pulse or the blood pressure of more than 10 mm Hg on inspiration is called pulsus paradoxus. It reflects the drop in inflow of blood into the right side of the heart, which automatically decreases the outflow of blood from the left ventricle. An increase in central venous pressure without an increase in blood pressure further documents the inability of the heart to receive fluid and pump it out into the systemic circulation; therefore, giving additional fluid would exacerbate the condition.

**(Choices 1,4 & 5)** Inserting a chest tube into the left pleural cavity, decreasing venous pressure by administering a venodilator, and decreasing venous pressure by administering a loop diuretic would be incorrect steps in management, at least at this time.

**Category: Surgery**

A 45-year-old man comes to the emergency department because of severe right flank pain that began abruptly 3 hours ago. The pain comes in waves and radiates down to the ipsilateral testis. The patient is nauseated and extremely restless. His temperature is 37.0 C (98.6 F). Dipstick examination of urine is positive for hematuria. Urinary pH is 5.8. Which of the following is the most appropriate next step in diagnosis?

1. ☐ Intravenous pyelography (IVP)
2. ☐ Plain abdominal x-ray film ☐
3. ☐ Renal ultrasound examination
4. ☐ Serum calcium, phosphorus, electrolytes, and uric acid
5. ☐ Urine cultures

**INCORRECT** ☐

**The correct answer is 2.**

A plain abdominal x-ray film is most likely to detect a stone in this patient, who manifests the typical symptomatology of renal colic, most commonly due to a urinary stone impacted in the ureter. Usually, gross or microscopic hematuria is present. Absence of fever is an important negative sign excluding coexistence of urinary tract infection. Most urinary stones consist of calcium phosphate or oxalate and thus contain enough calcium to be visible on plain x-ray films. However, some urinary calculi are radiolucent (especially uric and cystine stones), whereas others are so small as to be undetectable on plain x-ray films.

**(Choice 1)** is rarely necessary in patients with the typical presentation of renal colic.

However, IVP becomes necessary when the diagnosis is uncertain. Frequently, this investigation will demonstrate dilatation of the ureter proximal to the site of stone blockage.

**(Choice 3)** is useful when the stone is suspected to be located at the ureterovesical junction.

The bladder should be full to allow ultrasonography.

**(Choice 4)** Serum calcium, phosphorus, electrolytes, and uric acid should be evaluated in patients experiencing a first urinary tract stone, but serum chemistry studies are not necessary as initial diagnostic investigations.

**(Choice 5)** Urine cultures are not necessary for uncomplicated urinary stone disease without clinical evidence of urinary tract infection. However, abnormal urinary pH should suggest participation of infectious agents in stone formation. Proteus infections result in alkaline pH because of urease production. On the other hand, a pH lower than 5.0 suggests uric or cystine stones.

**Category: Surgery**

A 77-year-old woman is brought to the emergency department because of sudden-onset intense diffuse abdominal pain followed by vomiting. Her past medical history is significant for chronic uncontrolled hypertension, cerebrovascular accident, diabetes and hyperlipidemia. She takes multiple medications. She does not use tobacco, alcohol or drugs. Her temperature is 38.3 °C (101 °F), blood pressure is 180/100 mm Hg, pulse is 110/min and irregular and her respirations are 22/min. She is in severe distress. Lungs are clear to auscultation. Abdominal examination shows severe pain to palpation and nearly absent bowel sounds. There is rigidity and rebound. Rectal examination shows heme-positive stools. EKG shows absent P waves, irregular rhythm and inverted T waves. There are no previous EKGs for comparison. An x-ray film of the chest shows cardiomegaly. Laboratory studies show:

**Hematocrit:** 49%

**Leukocyte count:** 17,500/mm<sup>3</sup>

**Troponin I:** normal

What is the most likely diagnosis?

1. ☐ Myocardial infarction
2. ☐ Acute pancreatitis
3. ☐ Ruptured abdominal aortic aneurysm
4. ☐ Bowel infarction ☐
5. ☐ Acute cholecystitis

**INCORRECT** ☐

**The correct answer is 4.**

The patient described is suffering from acute embolic mesenteric ischemia that has progressed to bowel infarction. The acute form of mesenteric ischemia typically presents with sudden-onset severe poorly localized (visceral) midabdominal pain accompanied by nausea and vomiting. In the early stages of ischemia, physical examination is typically unremarkable. When bowel infarction occurs, patients develop peritoneal signs on abdominal examination, such as tenderness to palpation with guarding and rebound tenderness. Bowel infarction is also characterized by the passage of bloody stool. The most common cause of acute mesenteric ischemia is embolic occlusion. Emboli typically originate in the heart. The patient described has atrial fibrillation (AF) based on her rapid irregular pulse and the absence of P waves on EKG. AF predisposes to thrombus formation within the fibrillating atria. This is typically prevented by anticoagulating all patients with AF, but some patients, such as those who have suffered a prior intracerebral hemorrhage or subdural hematoma, are not candidates for chronic anticoagulation.



**(Choice 1)** Though patients with diabetes may have “silent” myocardial infarctions (MI), which do not produce chest pain, an MI is unlikely in this setting due to the presentation with abdominal pain and the negative troponin value. T wave inversions in the above patient could be due to long standing hypertension.

**(Choice 2)** Severe acute necrotizing pancreatitis produces epigastric pain radiating to the back with a “boring” quality. It is possible but less likely given the patient’s age and other comorbidities that put her at risk for mesenteric thrombosis. Pancreatitis is classically associated with gall stones or chronic alcoholism.

**(Choice 3)** Patients with a ruptured AAA typically experience acute abdominal or back pain followed by syncope. Hypovolemic shock ensues and many patients do not survive long enough to receive medical care.

**(Choice 5)** Acute cholecystitis classically presents with acute right upper quadrant abdominal pain, fever, nausea and vomiting. Heme-positive stools are not typically seen.

## 261. Question

1 points

### Category: Surgery

A 50-year-old postman presents with a six-month history of left calf pain that is brought on by walking and is relieved by rest. The patient reports no other symptoms. He has smoked cigarettes for the past 25 years, but does not drink alcohol or use illicit drugs. On physical examination, he has a blood pressure of 158/92 mm Hg and a pulse of 88 beats per minute. The heart and lung examinations are normal. A bruit is heard over the left femoral artery. Popliteal, dorsalis pedis and posterior tibial pulses are palpable bilaterally. The electrocardiogram shows normal sinus rhythm and Q-waves in II, III, and aVF. Which of the following is the best next step in management?

1. ☐ Reassurance
2. ☐ Ankle-brachial pressure index measurement ☐
3. ☐ Duplex scan of arteries of lower limbs
4. ☐ Contrast arteriography
5. ☐ Endovascular stent placement

**INCORRECT** ☐

**The correct answer is 2.**

This patient has peripheral artery disease (PAD) manifesting with left lower extremity claudication (exertion related pain relieved with rest). Though intermittent claudication can result from a number of etiologies, atherosclerotic vascular disease is the most common cause by far. Risk factors include increasing age, diabetes mellitus, cigarette smoking, hypertension, and hyperlipidemia. PAD affects up to 14 % of individuals over age 70, though



up to 50% of patients may be asymptomatic. In severe cases, limb ischemia and infarction can result. Measurement of the ankle-brachial index (ABI) is the first step in diagnosing PAD. The ABI is calculated by dividing the systolic blood pressure obtained by Doppler in the posterior tibial and dorsalis pedis arteries by that in the brachial artery. Ratios of 1 to 1.3 are considered normal. An ABI less than 0.9 is highly sensitive and specific for greater than 50% occlusion in a major vessel. AB is less than 0.4 are consistent with limb ischemia. After PAD is diagnosed by ABI, a number of different imaging studies may be performed to more accurately identify the occluded vessel.

**(Choice 1)** This high-risk patient with clinical claudication requires more than reassurance.

**(Choice 3)** Arterial duplex ultrasonography is a non-invasive test helpful in determining the exact vessel(s) involved in PAD. It is actually less sensitive and specific than the ABI for diagnosing PAD but can help to identify the specific vessels responsible for symptoms once the diagnosis is made.

**(Choice 4)** Contrast arteriography is the gold standard for evaluating PAD as it is highly sensitive and specific for determining the specific vessels involved. However, because it is an invasive procedure requiring arterial puncture and the use of contrast dye, it is best reserved for instances when the diagnosis is unclear or when planning invasive interventions.

**(Choice 5)** Endovascular stenting may be used in patients with claudication refractory to medical therapy and in patients with a single, hemodynamically significant lesion or limb ischemia who are not candidates for surgical intervention.

## 262. Question

1 points

### Category: Surgery

A 44-year-old male is found unresponsive and hypotensive at the scene of a high-speed motor vehicle accident. He is intubated and immediately rushed to the emergency department. The passenger in his car is pronounced dead at the scene. Physical examination in the ED shows large bruises over the entire chest wall and collapsed neck veins bilaterally. Lung exam reveals decreased breath sounds on the left side. Chest x-ray shows a large left hemothorax and a widened, rightward-deviating mediastinum. The most likely diagnosis is:

1. ☐ Esophageal rupture
2. ☐ Aortic injury ☐
3. ☐ Myocardial rupture
4. ☐ Myocardial contusion
5. ☐ Diaphragm rupture

INCORRECT ☐

**The correct answer is 2.**

Patients suffering rapid deceleration blunt chest trauma are at high risk for aortic injury. Oftentimes in the setting of high energy aortic injury secondary to blunt chest trauma, aortic transection, circulatory collapse, and death are immediate sequelae. A minority of patients with aortic injury have an incomplete or contained rupture. There are no clinical findings specific for aortic injury, but hypotension, external evidence of trauma and altered mental status are common. Once stabilized with airway, breathing, and circulation secured, patients should be assessed with an upright chest x-ray. Findings suggestive of aortic injury include a widened mediastinum, large left-sided hemothorax, deviation of the mediastinum to the right and disruption of the normal aortic contour. In these cases, the diagnosis can be confirmed via CT scanning. Management of patients with established aortic injury includes antihypertensive therapy where appropriate and immediate operative repair.

**(Choice 1)** Esophageal rupture following blunt trauma is rare. Manifestations of esophageal rupture include pneumomediastinum and pleural effusion. The diagnosis is confirmed with water-soluble contrast esophagography. Circulatory collapse is not seen.

**(Choice 3)** In most instances of myocardial rupture, death is the immediate result.

Occasionally, the rupture is contained by the pericardium resulting in cardiac tamponade, in which case muffled heart sounds, hypotension and distended neck veins will be noted on physical examination.

**(Choice 4)** Myocardial contusion classically causes tachycardia, new bundle branch blocks or arrhythmia. Sternal fracture is a commonly associated finding.

**(Choice 5)** Patients suffering diaphragmatic rupture may experience abdominal pain, pain referred to the shoulder, shortness of breath and vomiting. Radiographic studies will classically demonstrate abdominal viscera above the diaphragm and loss of the diaphragmatic contour.

## 263. Question

1 points

### Category: Surgery

A 25-year-old man is brought to the emergency department after falling 12m (40ft) from a ladder. He is unconscious. Examination shows obvious head and neck injuries, and a fractured forearm. He is totally apneic. Which of the following would be the best method to establish an immediate definitive airway in this patient?

1. ☐ Nasotracheal intubation
2. ☐ Orotracheal intubation ☒
3. ☐ Needle cricothyroidotomy
4. ☐ Intubation over a fiberoptic bronchoscope
5. ☐ Surgical tracheostomy

**INCORRECT** ☐

**The correct answer is 2.**

In managing the patient with trauma, first priority should be to establish an airway followed by securing breathing and circulation (ABC of resuscitation). In a totally apneic patient like this, an appropriate airway should be restored as soon as possible. Orotracheal intubation is the best way to restore airway in this patient. A facemask is not a mean to establish an airway. An orotracheal intubation needs hyperextension of neck and should be done only after a cervical spine injury is ruled out or in case of apneic patient. Though this patient is apneic and is also at risk of having a cervical injury the benefits of orotracheal intubation outweighs the risk and so an orotracheal intubation should be done with care not to move the head. Another option would be to do a surgical cricothyroidotomy.

**(Choice 1)** Nasotracheal intubation is a blind procedure and it is necessary that patient should have a spontaneous breathing. Thus it is contraindicated in apneic patients.

**(Choice 3)** Needle cricothyroidotomy is an excellent field procedure to establish an airway especially in children. However, it is not suitable in adults due to risk of carbon dioxide retention especially in patients with head injury where hyperventilation can be required to prevent or treat intracranial hypertension.

**(Choice 4)** Intubation over a fiberoptic bronchoscope although very effective cannot be performed so rapidly to meet the needs of an apneic patient

**(Choice 5)** Tracheostomy is no longer a first option to establish an airway because of its complications. A surgical cricothyroidotomy is always preferred over surgical tracheostomy, however a cricothyroidotomy should be converted to formal tracheostomy in 5- 7 days if prolonged airway control is needed as cricothyroidotomy has high incidence of tracheal stenosis with prolonged use.

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## 264. Question

**1 points**

### Category: Surgery

A four-year-old boy is brought to the physician because of discomfort in the left hip and left knee that is causing him to limp. Examination shows normal knee joints bilaterally, but there is marked limitation of internal rotation and abduction of the left hip. His temperature is 37.1 °C (98.6 °F), blood pressure is 90/60 mm Hg, pulse is 80/min and respirations are 16/min. Laboratory studies including complete blood count and basic metabolic profile show no abnormalities. Which of the following is the most likely diagnosis?

1. ☐ Slipped capital femoral epiphysis
2. ☐ Septic arthritis of the hip joint
3. ☐ Hematogenous osteomyelitis

- 4. ☐ Legg-Calve-Perthes disease ☐
- 5. ☐ Developmental dysplasia of the hip

**INCORRECT** ☐

**The correct answer is 4.**

Legg-Calve-Perthes disease refers to idiopathic osteonecrosis of the femoral head. It classically affects children four to ten years of age and exhibits a predilection for males. Patients generally present with mild chronic pain of insidious onset in the hip or knee as well as an antalgic gait. Physical examination shows marked limitation of internal rotation and abduction at the hip joint. Proximal thigh atrophy may also be present. X-rays may be negative initially, but serial studies will show changes in the femoral head consistent with necrosis and recalcification. MRI and bone scans show findings suggestive of femoral head necrosis much earlier than standard x-rays and may be used to make the diagnosis months earlier. Treatment is aimed at maintaining placement of the femoral head within the acetabulum so that it may heal in the proper shape and position. This may be accomplished with splints or surgery.

**(Choice 1)** Slipped capital femoral epiphysis is seen classically in obese adolescent males. Patients present with hip or knee pain and an antalgic gait.

**(Choice 2)** Septic arthritis most commonly presents with acute-onset pain, swelling and warmth of a single joint accompanied by fever and leukocytosis.

**(Choice 3)** In children, hematogenous osteomyelitis most commonly affects the metaphysis of long bones such as the humerus, tibia and femur. Patients will be acutely ill with fever, chills and motion-limiting pain.

**(Choice 5)** Developmental dysplasia of hip is a congenital disorder typically diagnosed in infancy as all the infants are regularly screened for DOH.

265. Question

1 points

**Category: Surgery**

A 38-year-old man was taken to an emergency facility after his car skidded on the freeway and struck a pillar. His vital signs were as follows: pulse, 88/min; respirations, 20/min; blood pressure, 100/70 mm Hg. Physical examination revealed non-prominent jugular neck veins, no indication of cyanosis, and symmetric breath sounds. A posterior–anterior chest x-ray film revealed a widened mediastinum. Which of the following choices is the most likely diagnosis?

- 1. ☐ Ruptured aortic aneurysm
- 2. ☐ Cardiac tamponade
- 3. ☐ Dissection of the thoracic aorta ☐

- 4. ☐ Myocardial contusion
- 5. ☐ Pulmonary contusion

**INCORRECT** ☐

**The correct answer is 3.**

This patient most likely has traumatic dissection of the thoracic aorta caused by a deceleration injury. Disruption of the aorta can occur at the root (the origin of the ligamentum arteriosum) or at the diaphragm. Prognosis is poor, with 85% of patients dying at the scene of the accident, and only 15% making it to the hospital. These patients have small tears or effective tamponading. The intima and media are fractured, leaving the adventitia intact. Blood collects subjacent to the adventitia, giving rise to a pseudoaneurysm, which is seen as a widened mediastinum on a posterior–anterior chest x-ray film. A widened mediastinum is the most consistent sign associated with traumatic disruption of the thoracic aorta and should immediately make one suspect this lesion. Approximately one-third of patients have no presenting clinical symptoms after traumatic disruption of the thoracic aorta.

**(Choice 1)** is usually seen in the elderly. The most common cause for this condition is atherosclerosis. There may be a longstanding history of hypertension and associated coronary artery disease. A palpable pulsatile mass is present in the epigastric region. Unlike traumatic disruption of the thoracic aorta, this is a true aneurysm.

**(Choice 2)** most often follows blunt chest injury. It is associated with elevated venous pressure, hypotension, and muffled heart sounds. These three signs compose Beck's triad. Of these, hypotension is the most reliable symptom, because elevated venous pressure may not be seen in the presence of severe hypotension, and the heart sounds are not muffled on many occasions. Tachycardia is present, and the chest radiograph is noncontributory, as acute effusions are not discernible. Two-dimensional echocardiography is the best test to confirm the diagnosis. Treatment involves pericardiocentesis.

**(Choice 4)** follows blunt chest trauma. It mainly involves the right ventricle. Patients may not have symptoms at initial presentation. Presence of a new right bundle branch block on electrocardiogram should point to the diagnosis. Radionuclide angiography is the most sensitive test to detect this condition.

**(Choice 5)** may also follow blunt chest trauma. Patients may appear remarkably fit. Chest x-ray films may show a few patchy infiltrates that progress with time. Respiratory failure can develop rapidly. Therefore, one should have a high index of suspicion when confronted with a patient with vague symptoms after blunt chest injury.

A 65-year-old diabetic male comes to the physician because of pain in his calf muscles. His pain increases with walking. He also has end stage renal disease, hyperlipidemia and hypertension. His temperature is 36.7 °C (98 °F), blood pressure is 150/96 mm Hg, pulse is 80/min and respirations are 16/min. Examination shows skin atrophy, shiny skin and loss of hair on both legs below the knee. Which of the following would be most appropriate next step in management?

1. ☐ Prescribe amitriptyline for his pain
2. ☐ Obtain Doppler ultrasound examination
3. ☐ Obtain resting and post-exercise systolic blood pressures in the ankle and arm ☐
4. ☐ Segmental volume plethysmography
5. ☐ Obtain MRI of the spine

**INCORRECT** ☐

**The correct answer is 3.**

The patient described has peripheral vascular disease. Peripheral vascular disease most commonly occurs in older men with diabetes, hypertension and hyperlipidemia. Patients commonly present with claudication, as described in the patient above, as well as erectile dysfunction and other signs of vascular insufficiency such as skin changes. Skin changes include atrophy, a shiny quality, loss of appendages such as hair follicles and a propensity for non-healing wounds and ulceration. The degree of vascular insufficiency is best assessed with the ankle-brachial pressure index (ABI or ABPI). This test is done by determining the ratio of ankle to brachial systolic blood pressures. The normal value is 1; numbers that approach zero are associated with more advanced disease.

**(Choice 1)** Amitriptyline is used in the treatment of pain in the context of postherpetic neuralgia, neurologic pain and painful paresthesias.

**(Choice 4)** Segmental volume plethysmography and doppler ultrasound may be used to aid in determining the location of a lesion causing peripheral arterial disease, but the diagnosis should first be established with ABI. Doppler ultrasound is also used in the diagnosis of DVT.

**(Choice 5)** An MRI of the spine is useful in diagnosing disease of the soft tissue of the spine such as the spinal cord and intervertebral disks. It may be used in the evaluation of patients with radicular pain.

267. Question

1 points

**Category: Surgery**

A 25-year-old male is brought to the emergency department following a motor vehicle accident in which he was the unrestrained driver. The emergency response team's reports indicate that his breath smelled of alcohol at the scene. En route to the hospital, the patient receives 2 liters of



intravenous normal saline, and in the ED his blood pressure is 100/60 mm Hg, heart rate is 120/min, and respiratory rate is 34/min. His neck veins are flat. You note multiple bruises overlying his anterior chest wall and upper abdomen. On inspiration, there is inward motion of the right side of his chest wall. His abdomen is soft and non-distended. He is put on positive pressure mechanical ventilation and his chest movements become symmetric. Which of the following is the most likely diagnosis?

1. ☐ Tracheobronchial disruption
2. ☐ Esophageal rupture
3. ☒ Flail chest ☐
4. ☐ Pneumothorax
5. ☐ Air embolism

**INCORRECT** ☐

**The correct answer is 3.**

This patient endured major thoracic trauma and now has tachypnea and paradoxical thoracic wall movements that correct with positive pressure mechanical ventilation. These findings are consistent with a diagnosis of flail chest, a condition that occurs when multiple contiguous ribs are fractured in two or more locations, causing a segment of ribs to lose its continuity with the remainder of the thoracic wall. Because of the associated pain, patients with flail chest take shallow breaths and compensate for the resulting hypoxemia with hyperventilation. On examination, the isolated thoracic wall segment exhibits paradoxical inward motion on inspiration and outward movement on expiration. Pain control and supplemental oxygen are the most important early steps in managing this condition, but intubation with mechanical positive pressure ventilation is required in many patients with this injury. Positive pressure mechanical ventilation replaces the normal negative intrapleural pressure during spontaneous ventilation with positive intrapleural pressure. Because of the positive intrathoracic pressure induced by the ventilator, the previously paradoxically moving flail segment of the thoracic cage now moves out normally with the rest of the rib cage during inspiration.

**(Choice 1)** Tracheobronchial injury alone would not cause paradoxical motion of a segment of the thoracic cage. Signs of tracheobronchial injury include hemoptysis, pneumomediastinum, and air leak even after chest tube placement.

**(Choice 2)** Esophageal rupture secondary to blunt thoracic trauma would not alone cause paradoxical motion of a segment of the thoracic cage. Esophageal rupture can cause subcutaneous emphysema and potentially shock via mediastinitis and third spacing of intravascular fluid into the mediastinum.

**(Choice 4)** Without a chest tube, pneumothorax will worsen with positive pressure ventilation.



**(Choice 5)** A patient with an air embolism following major thoracic trauma might present with acute circulatory failure and neurologic signs. Air embolism would not alone cause paradoxical motion of a segment of the thoracic cage.

268. Question

1 points

**Category: Surgery**

A 54-year-old white woman presented to her family physician with a recent history of pain in the upper right quadrant of the abdomen associated with nausea, vomiting, and fever. She did have a prior history of discomfort in the stomach, especially after eating a fatty meal, but this lessened after she started eating salads and avoiding butter and fried foods. She had no other relevant medical history. She did not smoke and consumed alcohol only on social or religious occasions. On physical examination, she appeared to be in moderate distress, blood pressure 130/90 mm, pulse 78/min regular, respirations 18/min regular, and temperature 101°F (38.3°C). She was moderately obese and had minimal guarding and tenderness in the right upper quadrant. Examination of the rest of the abdomen was normal. Examination of the cardiovascular and respiratory systems was noncontributory. A complete blood count showed leukocytosis; a chemistry panel showed mildly elevated liver enzymes, but was otherwise unremarkable. X-ray films of the chest and abdomen were normal. Ultrasonography of the abdomen revealed a thickened gallbladder wall with a solitary calculus within. The bile ducts were not dilated. The pancreas and the terminal ducts were normal. Conservative treatment with nasogastric suction, analgesics, and antibiotics provided no relief, and she underwent laparoscopic cholecystectomy. Within 24 hours following surgery, the patient developed a temperature of 102°F (38.9°C); blood pressure 90/60 mm Hg; pulse 100/min regular; respirations 22/min, rapid and shallow; and urine output less than 30 mL/h. Her skin was clammy and cold. She complained about some chest discomfort and pain. The most likely cause for this development is which one of the following?

1. ☐ Hemoperitoneum ☐
2. ☐ Gram-negative sepsis
3. ☐ Acute myocardial infarction
4. ☐ Pulmonary embolus
5. ☐ Pneumothorax

**INCORRECT** ☐

**The correct answer is 1.**

This patient has the classic symptoms of hypovolemic shock, namely, hypotension, tachycardia, tachypnea, oliguria, and peripheral vasoconstriction resulting in cold clammy skin. Hemoperitoneum, i.e., intraabdominal hemorrhage) is the most common cause of

shock in the first 24 hours following abdominal surgery. The most likely cause is a slipped ligature from an artery, for example, the cystic artery. The hematocrit will not fall until several hours after the primary event. Management involves restoration of blood volume and immediate surgical intervention to secure the vessel and arrest the hemorrhage.

**(Choice 2)** results in endotoxic shock. Toxins released by gram-negative bacteria lead to vasodilatation of blood vessels. As a result, the patient would have a bounding pulse and warm skin. Other features include high fever and hypotension.

**(Choice 3)** is associated with chest pain. Cardiogenic shock could result from a massive myocardial infarction. In that case, the patient would have hypotension, tachycardia, and a weak pulse. The skin would not be warm, and fever, if present, would be low grade.

**(Choice 4)** usually presents several days after surgery. It is seen in patients who have been lying immobile for a few days in bed and then develop deep vein thrombosis. There may be calf swelling and tenderness, but pulmonary embolus without clinical symptoms of deep venous thrombosis has been known to occur. The patient would have sudden chest pain, hemoptysis, hypotension, and tachycardia.

**(Choice 5)** is associated with stabbing chest pain, tachypnea, tachycardia, and, in the case of tension pneumothorax, hypotension. Physical findings will include absent breath sounds, hyperresonance to percussion, and a tracheal shift to the contralateral side. This could follow insertion of a line into the subclavian vein.

## 269. Question

1 points

### Category: Surgery

A 62-year-old woman faints while waiting in line to get into a movie theater. When she is examined by her physician the next day, she is found to be pale, with yellowish sclera, and to have a hemoglobin level of 7 g/dL. Except for mild obesity, the rest of the physical examination is unremarkable, but her stool is strongly positive for occult blood. She is told that she will need a colonoscopy, but before the study is done, further laboratory results become available, showing that she has a total bilirubin of 3.5 mg/dL and an alkaline phosphatase of 850 U/L. The transaminases are minimally elevated. Her physician then orders a sonogram of the right upper quadrant, and the study shows dilated intrahepatic ducts, dilated extrahepatic ducts, and a large, distended, thin-walled gallbladder without stones. Which of the following should be the next diagnostic study performed?

1. ☐ Barium enema
2. ☐ CT scan of the liver
3. ☐ Liver biopsy
4. ☐ Percutaneous transhepatic cholangiogram
5. ☐ Upper gastrointestinal endoscopy ☒

**INCORRECT** ☐

**The correct answer is 5.**

A woman of this age who is found to be anemic and have occult blood in the stool should be suspected of having a cancer on the right side of the colon. Thus, the colonoscopy that was initially planned was the appropriate study. However, the patient also has obstructive jaundice, which is most likely of malignant origin (she has the sonographic equivalent of a positive Courvoisier-Terrier sign). Good clinical thinking involves attempting to find one single disease that explains all of the concurrent findings. Therefore, assuming that the patient has colon cancer plus a cancer of the head of the pancreas is not a good bet. A single tumor that would bleed into the gastrointestinal lumen and obstruct the common duct is ampullary carcinoma, and upper gastrointestinal endoscopy should identify it.

**(Choice 1)** If we insist in ruling out colon cancer, colonoscopy could be done during the session in which upper gastrointestinal endoscopy is performed. Barium enema would be a less attractive alternative.

**(Choices 2 & 3)** The problem is not in the liver and, thus, a CT scan or a biopsy of the organ is a misguided effort. Dilated intrahepatic ducts and dilated extrahepatic ducts point to a low obstruction of the biliary tree. They are not suggestive of liver metastasis or liver pathology. The laboratory findings are also suggestive of biliary obstruction rather than hepatocellular disease.

**(Choice 4)** Further definition of the nature of biliary obstruction can be obtained with an endoscopic retrograde cholangiopancreatogram (ERCP) or a percutaneous transhepatic cholangiogram (PTC). However, if we suspect that the obstructing tumor grows out of the duodenal wall, performing the study via a liver puncture (i.e., PTC) will miss the pathology. ERCP would find it, but, in fact, the full study would not have to be completed: As soon as the endoscopist looks at the ampulla, the tumor will be discovered. Cannulation of the ducts and injection of dye would not be needed.

270. Question

1 points

**Category: Surgery**

Renal ultrasound and intravenous pyelography (IVP) in a 65-year-old man evaluated for urinary incontinence reveal bilateral hydronephrosis. Which of the following is the most likely condition leading to this complication?

1. ☐ Age-associated detrusor overactivity
2. ☐ Alzheimer disease
3. ☐ Normal pressure hydrocephalus
4. ☐ Previous surgery

5. ☐ Prostatic hyperplasia ☐

**INCORRECT** ☐

**The correct answer is 5.**

Prostatic hyperplasia results in partial obstruction of the proximal urethra, causing hesitancy and decreased force of stream. With increasing degrees of prostatic enlargement, the volume of urine remaining in the bladder after voiding increases progressively until complete urinary retention manifests with occasional overflow incontinence. Urinary retention leads to dilatation of the ureters and renal pelves (hydronephrosis).

**(Choice 1)** is the most common cause of urinary incontinence in the elderly. It manifests with an uncontrollable urge to urinate not triggered by stress maneuvers. It seems to be related to a deficiency in the descending pathways that inhibit the voiding reflex triggered by bladder distension. This condition does not lead to urinary retention.

**(Choices 2 & 3)** Urinary incontinence associated with Alzheimer disease and normal pressure hydrocephalus is similar to detrusor overactivity and results from failure to inhibit the contractions of the vesical detrusor muscle.

**(Choice 4)** may cause sphincteric damage, resulting in total incontinence, in which leakage of urine is continuous. Obviously, this condition will not result in hydronephrosis since there is no obstruction to urinary outflow.

271. Question

1 points

**Category: Surgery**

A 75-year-old man was rushed to the emergency room of a local hospital after having collapsed at home. The patient's spouse related that he had complained of sudden severe pain over the left flank. She informed the physician that he had been complaining of backache for a few years, but did not want to see a physician, as he felt that it was "no big deal." Physical examination revealed a conscious male, in acute distress, with definite signs of hypotension, tachycardia, tachypnea, and hypothermia. He had mucosal pallor but no cyanosis. The abdomen was tender to palpation, and a pulsatile supraumbilical mass was present. Bowel sounds were diminished, and peripheral pulses were equal and moderately strong. The patient was given 100% oxygen by mask, at 10 L per minute. The cardiac monitor showed sinus tachycardia with mild ischemia. Which of the following mechanisms is most likely involved in the pathogenesis of this patient's clinical disorder?

1. ☐ Cystic medial degeneration
2. ☐ Defect in collagen
3. ☐ Defect in fibrillin
4. ☐ An immunologic reaction

**INCORRECT** ☐**The correct answer is 5.**

This patient has a ruptured abdominal aortic aneurysm. The abdominal aorta is retroperitoneal. Rupture can be heralded by severe flank or back pain due to bleeding posteriorly into the retroperitoneal space. This is true in 80% of cases; however, in the remaining 20%, the aneurysm ruptures anteriorly into the peritoneal cavity. Hypotension due to blood loss and a pulsatile mass in the epigastrium are also found. Prior to rupture, patients may have a history of backache or a vague discomfort in the epigastric region. Some 95% of cases of abdominal aortic aneurysm are due to atherosclerosis (**Choice 5**). Other causes include Marfan syndrome, trauma, mycotic infection, and syphilis. Most aneurysms occur below the renal arteries, as the vasa vasorum are lacking here. Lack of inherent blood supply here leads to tissue hypoxia, atherosclerosis, and weakening of the aortic vessel wall. There may be associated atherosclerosis elsewhere, such as the iliacs, and coronaries.

(**Choice 1**) is involved in the pathogenesis of aortic dissections due to hypertension in elderly men or connective tissue disorders in younger individuals.

(**Choices 2 & 3**) CMD occurs in the middle and outer part of the aorta and is characterized by elastic tissue fragmentation and the presence of cleft like spaces containing acid mucopolysaccharides. CMD also occurs in Ehlers-Danlos syndrome, in which there is a defect in collagen (**Choice 2**) and Marfan syndrome, in which there is a defect in fibrillin (**Choice 3**). Aortic dissections are the most common cause of death in these connective tissue disorders.

(**Choice 4**) has been implicated in the pathogenesis of some cases of abdominal aortic aneurysms; however, it is rare.

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## 272. Question

**1 points****Category: Surgery**

A 74-year-old male is undergoing elective abdominal aortic aneurysm repair. He is given two units of packed red blood cells during the surgery. He develops fever and chills one hour after finishing the surgery and transfusion. He received one dose of prophylactic antibiotics before surgery. He had coronary bypass grafting two months ago. His temperature is 38.5 °C (101.3 °F), blood pressure is 130/76 mm Hg, pulse is 90/min and respirations are 16/min. Physical examination shows a mildly tender wound; there is no redness. The lungs are clear to auscultation. He has a Foley catheter and right subclavian central venous access, each placed at the time of surgery. Which of the following is the most likely cause of his fever?

- 2. ☐ Drug fever
- 3. ☐ Malignant hyperthermia
- 4. ☐ Pulmonary embolism
- 5. ☐ Surgical site infection
- 6. ☐ Transfusion reaction ☐

**INCORRECT** ☐

**The correct answer is 6.**

The patient described is experiencing a fever acutely following surgery for an abdominal aortic aneurysm repair where two units of packed red blood cells were transfused. The time course of this fever is too acute to be attributable to DVT, infection, hematoma or drugs. The patient is most likely suffering an acute febrile nonhemolytic transfusion reaction (AFNTR). Acute transfusion reactions classically occur during or within a few hours of completion of the transfusion. Classically patients with AFNTR experience an increase in temperature of at least one degree Centigrade accompanied by rigors. AFNTR is an immune-mediated phenomenon mediated by host antibodies that bind to donor cells causing the activation of complement components and release of inflammatory cytokines. The condition worsens with continued transfusion of the offending blood product. Treatment is with discontinuation of the blood product transfusion and administration of antipyretics.

**(Choice 1)** Nosocomial pneumonia is unlikely as the patient is not tachypneic, the lungs are clear to auscultation and the onset of fever is acute.

**(Choice 2)** Drug fever most commonly occurs one to two weeks following initiation of therapy. It is more commonly associated with the use of anticonvulsants and trimethoprim/sulfamethoxazole, though the list of possible drugs is lengthy.

**(Choice 3)** Malignant hyperthermia is caused by inhaled anesthetics. Patients typically have fever, tachycardia, acidosis, rhabdomyolysis and are at high risk for cardiac arrest and death.

**(Choice 4)** Patients with pulmonary embolism present with pleuritic chest pain, tachypnea, dyspnea and possibly hemoptysis.

**(Choice 5)** Surgical site infection is not likely to cause fever in the acute postoperative period. Additionally, on exam the patient wound is consistent with a normal postoperative wound.

273. Question

1 points

**Category: Surgery**

A 35-year-old man is brought to the emergency department after he jumped from the fourth floor of a burning building. His temperature is 36.9 °C (98.5 °F), blood pressure is 90/40, pulse is 90/min, and respirations are 20/min. Examination shows a fracture of the right tibia. He is conscious and his pupils are bilaterally equal and reactive to light and accommodation. His neurological examination



shows paraplegia, with loss of pain and temperature in both legs but normal proprioception. Upper extremities do not show any neurological deficits. Passive straight leg raising test is negative. A CT scan of the spine shows a burst fracture at the level of the fourth thoracic vertebra. Which of the following is the most likely diagnosis?

1. ☐ Central cord syndrome
2. ☐ Anterior cord syndrome ☒
3. ☐ Brown Sequard syndrome
4. ☐ Acute disk prolapse
5. ☐ Cauda equine syndrome

**INCORRECT** ☒

**The correct answer is 2.**

This clinical presentation is a characteristic of anterior cord syndrome. Anterior cord syndrome is commonly associated with burst fracture of the vertebra and is characterized by total loss of motor function below the level of lesion with loss of pain and temperature on both sides below the lesion. MRI is the best investigation to study the extent of neurological damage.

**(Choice 1)** Central cord syndrome is characterized by burning pain and paralysis in upper extremities with relative sparing of lower extremities. It is commonly seen in elderly secondary to forced hyperextension type of injury to the neck.

**(Choice 3)** Brown Sequard syndrome is acute hemisection of cord and is characterized by ipsilateral motor and proprioception loss and contra lateral pain loss below the level of lesion.

**(Choice 4)** Acute disk prolapse will be characterized by severe radicular pain with positive straight leg raising test.

**(Choice 5)** Cauda equine syndrome is characterized by paraplegia, variable sensory loss, urinary and fecal incontinence and it would not occur secondary to fracture of fourth thoracic vertebra.

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274. Question

1 points

**Category: Surgery**

A neonate does not pass any meconium during the first day of life. On day 2 he is brought for evaluation because of repeated green vomiting and progressive abdominal distention. X-ray films of the abdomen show multiple dilated loops of small bowel and no gas in the colon. A contrast enema shows a normally positioned microcolon, and the contrast material refluxes freely into the small



bowel, filling some of the more distal distended loops. Exploratory laparotomy is done. There is no malrotation, the small bowel does not have any atretic or obstructed segments, and there is no inspissated meconium in it. Which of the following is most appropriate next step in management?

1. ☐ Diverting ileostomy
2. ☐ Diverting ileostomy and appendectomy ☐
3. ☐ Transverse loop colostomy
4. ☐ Total colectomy
5. ☐ Total proctocolectomy and permanent ileostomy

**INCORRECT** ☐

**The correct answer is 2.**

The diagnosis is one of exclusion: the multiple dilated loops of small bowel rule out duodenal atresia or annular pancreas, leaving malrotation as a possibility. That was ruled out by the contrast enema, and the operative findings. The microcolon is the sign of an “unused” colon, i.e., nothing has been getting to it, which brings to mind intestinal atresia or meconium ileus, both of which have been ruled out as well. That leaves us with aganglionic colon (Hirschsprung disease), the extent of which can vary tremendously. If the entire colon is aganglionic, this exact clinical picture will result. The diverting ileostomy will take care of the functional obstruction, whereas the appendix provides the safest way to obtain tissue for the pathologist to confirm the absence of ganglia. Definitive repair will be done when the child is a little older.

**(Choice 1)** A diverting ileostomy alone would take care of the immediate problem, but would not help establish the diagnosis.

**(Choice 3)** Diversion at the transverse colon would leave a functionally obstructed segment in the circuit.

**(Choice 4)** will eventually be done, but not before establishing a diagnosis.

**(Choice 5)** Total proctocolectomy is not done for aganglionic megacolon. The denervated segment is removed, but the normal gut is then brought down to the anus or a portion of the distal rectum.

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275. Question

1 points

**Category: Surgery**

A 35-year-old man is brought to the emergency department after being involved in a motor vehicle collision. He is unconscious. His blood pressure is 100/50 mm Hg, pulse is 100/min, and respirations are 19/min. Examination shows bilaterally reactive and non-dilated pupils. He does not

follow commands and makes inappropriate sounds. A CT scan of the head shows numerous minute punctate hemorrhages with blurring of the gray-white matter interface. Which of the following is the most likely diagnosis?

1. ☐ Epidural hematoma
2. ☐ Subdural hematoma
3. ☐ Diffuse axonal injury ☒
4. ☐ Subarachnoid hemorrhage
5. ☐ Multiple sclerosis

**INCORRECT** ☐

**The correct answer is 3.**

Diffuse axonal injury is the most significant cause of morbidity in patients with traumatic brain injuries. It is frequently due to traumatic deceleration injury and results in vegetative state as in this patient. Sudden acceleration-deceleration impact produces rotational forces that affect the brain areas where the density difference is the maximum, thus most of the diffuse axonal injury occur at gray white matter junction. Clinical features of patients with diffuse axonal injury are out of proportion with the CT scan findings. Patient loses consciousness instantaneously and later develops persistent vegetative state. CT scan characteristically shows numerous minute punctate hemorrhages with blurring of grey white interface. However, MRI is more sensitive than CT scan for diagnosing diffuse axonal injury.

**(Choice 1)** Epidural hematoma will show as a biconvex hematoma on CT scan.

**(Choice 2)** Subdural hematoma will show as a lenticular hematoma on CT scan.

**(Choice 4)** Subarachnoid hemorrhage will present with acute severe headache and CT will show presence of blood within subarachnoid space.

**(Choice 5)** Multiple sclerosis (MS) is a progressive neurological disorder that can involve multiple foci of white matter. CT scan will not show MS lesions but MRI will show MS lesions in white matter in the periventricular areas.

276. Question

1 points

**Category: Surgery**

The patient states that the pain is located primarily around his umbilicus and is unremitting and intense in nature. The physical exam is concerning for pain out of proportion to his exam. Past medical history is significant for diabetes mellitus and atrial fibrillation, for which the patient takes insulin and aspirin, respectively. You order a panel of labs, including a CBC, metabolic panel, hepatic panel, and an arterial blood gas. Which of the following abnormalities consistent with your diagnosis would you expect in this patient?

1. ☐ Decreased hematocrit
2. ☐ Metabolic acidosis ☐
3. ☐ Metabolic alkalosis
4. ☐ Hyponatremia
5. ☐ Decreased albumin

**INCORRECT** ☐

**The correct answer is 2.**

In addition to the classic findings on a physical exam, patients with mesenteric ischemia often present with leukocytosis and metabolic acidosis (lactic acidosis). This acute condition is associated with a high mortality rate, and prompt diagnosis and treatment are imperative.

**(Choice 1)** As a later sign of ischemic bowel, patients may develop gastrointestinal bleeding with a decrease in hematocrit, but only as a late finding, not as a presenting symptom.

**(Choice 3)** Metabolic alkalosis may be due to overaggressive diuresis, persistent emesis, exogenous bicarbonate loading, or a so-called contraction alkalosis. None of these findings would be expected with ischemic bowel.

**(Choice 4)** The sodium level is not usually directly affected by ischemic bowel.

**(Choice 5)** Decreased albumin is seen in states of chronic malnutrition, not acutely in ischemic bowel.

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## 277. Question

**1 points**

### Category: Surgery

A 6-year-old male is brought into the emergency room as a trauma patient after being struck by an automobile while playing in his front yard. The patient is hypotensive and has bilateral open femur fractures, from which he is hemorrhaging severely. The child is crying but his SaO<sub>2</sub> level is 99% on room air. You are very concerned that he will exsanguinate from his femur fractures. What is the first step in the management of this patient?

1. ☐ Apply direct pressure to the bleeding vessels
2. ☐ Apply a tourniquet
3. ☐ Transfuse type O-negative RBCs
4. ☐ Obtain control of the airway ☐
5. ☐ Transfuse 2 units FFP

**INCORRECT** ☐

**The correct answer is 4.**

This critically ill young boy may be bleeding to death from his numerous injuries. Despite the severity of his injuries and the fact that he appears to be oxygenating well, the first step is to establish a secure airway. In a trauma situation, airway, breathing, and circulation take priority, and should be addressed in that order. Controlling the bleeding and giving red blood cells (RBCs) and fresh frozen plasma (FFP) are secondary to obtaining a secure airway. **(Choices 1, 3 & 5)** These steps are all important measures and need to be performed expediently, but only after the airway is secure.

**(Choice 2)** A tourniquet is not used in the trauma situation. Direct pressure to the bleeding vessels is required.

278. Question

1 points

**Category: Surgery**

A 34-year-old woman is admitted for septic shock secondary to a urinary tract infection. In the intensive care unit, she receives dopamine, intravenous fluids and antibiotics and requires central line placement for venous access. Which of the following is the most important safeguard to prevent respiratory and cardiac complications following central line placement?

1. ☐ Insertion via right jugular vein
2. ☐ ECG monitoring
3. ☐ Free aspiration of blood after final catheter placement
4. ☐ Cardiac ultrasound after placement
5. ☐ Chest x-ray confirmation of catheter tip location after placement ☐

**INCORRECT** ☐

**The correct answer is 5.**

Complications from central venous catheter (CVC) placement occur in 1-5% of cases and include arterial puncture, pneumothorax, hemothorax, thrombosis, air embolism, sepsis, vascular perforation and myocardial perforation leading to tamponade. Thus radiographic confirmation of the position of the catheter tip is required following CVC insertion. To avoid myocardial perforation, the catheter tip should be located proximal to the cardiac silhouette or proximal to the angle between the trachea and the right mainstem bronchus. Ideally, the

catheter tip should lie in the superior vena cava; tip placement in smaller veins like the subclavian, jugular, azygous or internal mammary predisposes to vascular perforation. Chest x-ray is also required to ensure the absence of iatrogenic pneumothorax and hemothorax.

**(Choice 1)** CVC insertion via the jugular vein carries similar risks for pneumothorax and myocardial perforation as the subclavian approach. The femoral approach is less likely to cause pneumothorax but is significantly more prone to infection.

**(Choice 2)** There is no value to monitoring cardiac electrical activity during CVC insertion.

**(Choice 3)** Aspiration of blood assures only that the tip of the catheter is within the vasculature. It does not determine the location of the catheter tip or negate the risk of pneumothorax.

**(Choice 4)** Cardiac ultrasound can detect fluid in the pericardium but cannot precisely determine the placement of the catheter tip or the presence of pneumothorax.

## 279. Question

1 points

### Category: Surgery

A 39-year-old woman is involved in a head-on, high-speed automobile collision. She arrives at the emergency department in a deep coma, with bilaterally fixed dilated pupils. She has normal blood pressure and pulse rate. CT scan of the head shows diffuse blurring of the gray-white interface and multiple small punctate hemorrhages. There is no single large hematoma or displacement of the midline structures. Extension of the CT to include the neck shows no cervical spine fractures. Which of the following is the most appropriate initial step in management?

1. ☐ Improvement of cerebral perfusion by infusion of large amounts of IV fluids
2. ☐ Improvement of cerebral perfusion by the use of systemic vasodilators
3. ☐ Preservation of neurologic function by the use of hyperbaric oxygen
4. ☐ Prevention of further damage due to development of increased intracranial pressure
5. ☐ Surgical evacuation of the multiple punctate hemorrhages

**INCORRECT** ☐

**The correct answer is 4.**

The patient has already sustained the neurologic damage due to the initial blow and is not threatened by a single large hematoma displacing the midline structures. However, she is still vulnerable to further neurologic impairment resulting from the development of increased intracranial pressure. If the intracranial pressure is medically prevented or minimized (with fluid restriction, diuretics, and hyperventilation), her chances of recovery are somewhat better.

**(Choice 1)** The patient has normal vital signs; therefore, infusing IV fluids would not help. If she had been in shock, the brain would have suffered from inadequate perfusion, and restoring intravascular volume would have been a good idea. In this case, the additional fluid would simply compound the problem of increased intracranial pressure.

**(Choice 2)** Systemic vasodilators would decrease intravascular pressure and work against the local vasoconstriction that hyperventilation would have offered. The end result would be less cerebral perfusion.

**(Choice 3)** Hyperbaric oxygen has no role in the prevention or treatment of increased intracranial pressure.

**(Choice 5)** Surgical evacuation is indicated for hematomas that are displacing the midline structures.

280. Question

1 points

**Category: Surgery**

A 23-year-old woman comes to the physician because of a 4-week history of a whistling noise during respiration. She underwent a difficult rhinoplasty a few months ago. The noise is getting louder and is annoying. Which of the following is the most likely diagnosis?

1. ☐ Nasal septal perforation ☐
2. ☐ Nasal polyp
3. ☐ Nasal foreign body
4. ☐ Allergic rhinitis
5. ☐ Nasal furunculosis

**INCORRECT** ☐

**The correct answer is 1.**

Complications are common following rhinoplasty, and up to one in four rhinoplasties may need revision. Common complications include patient dissatisfaction, nasal obstruction and epistaxis. Those that involve the nasal septum are less common but more serious. The septum is made up of cartilage and has poor blood supply contrasting sharply with the rich anastomosing blood supply of the nasal sidewall. The underlying cartilage relies completely on the overlying mucosa for nourishment by diffusion. Because of the poor regenerating capacity of the septal cartilage, trauma or surgery on the septum may result in septal perforation. The typical postoperative presentation is a whistling noise heard during respiration. Following nasal surgery, septal perforation is typically the result of a septal

hematoma though a septal abscess may also be the cause. Additional conditions that can cause septal perforation are self-inflicted trauma (nose picking), syphilis, tuberculosis, intranasal cocaine use, sarcoidosis and Wegener granulomatosis.

**(Choice 2)** Nasal polyps are usually seen in patients with asthma and allergic disorders but may also occur in patients with other inflammatory conditions of the nasal mucosa. They may cause chronic nasal obstruction and should be surgically removed in symptomatic patients.

**(Choice 3)** Foreign bodies are common in children. On presentation, patients will have nasal obstruction and may have a foul odor, halitosis and nasal bleeding. Following surgery, a retained foreign body such as nasal packing most classically would cause toxic shock syndrome.

**(Choice 4)** Allergic rhinitis commonly presents with rhinorrhea, nasal pruritus, cough and occasionally dyspnea. On examination, the nasal mucosa is edematous and pale, and polyps may be present.

**(Choice 5)** Nasal furunculosis results from staphylococcal folliculitis following nose picking or nasal hair plucking. It is potentially life threatening as it can spread to the cavernous sinus. Patients complain of pain, tenderness and erythema in the nasal vestibule.

## 281. Question

1 points

### Category: Surgery

A 36-year-old male presents with firm, non-tender swelling of his right cheek. He tells you that he had similar swelling at that site two years ago and was diagnosed with a tumor, which was subsequently removed without complication. Examination reveals fullness of the parapharyngeal space on the right side. Repeat surgery in this patient is most likely to result in which of the following complications?

1. ☐ Hoarseness
2. ☐ Tic douloureux
3. ☐ Facial droop ☒
4. ☐ Tongue palsy
5. ☐ Jaw asymmetry

**INCORRECT** ☐

**The correct answer is 3.**

This patient has a recurrent parotid neoplasm. The two lobes of the parotid gland are separated by the facial nerve, which courses directly through the substance of the gland. From his history, it seems this patient initially had a superficial parotidectomy in order to



excise the tumor. Now, to completely excise this recurrent tumor, removal of the deep lobe of the parotid is required. This will necessitate dissection of the branches of the facial nerve from the parotid tissue. If the facial nerve (CN VII) is involved by the tumor, then it may need to be sacrificed in order to achieve a cure. The extracranial facial nerve carries motor innervation to the muscles of facial expression. Its destruction will cause a unilateral facial droop.

**(Choice 1)** Hoarseness can result from injury to the recurrent laryngeal branches of the vagus nerve. These nerves are vulnerable to damage during surgery on the thyroid or parathyroid glands.

**(Choice 2)** Tic douloureux (trigeminal neuralgia) manifests with short bursts of excruciating, lancinating pain lasting from seconds to minutes in the distribution of the second and third branches of the trigeminal nerve. The etiology is likely external compression of the trigeminal nerve.

**(Choice 4)** Hypoglossal nerve injury can cause tongue palsy. Surgery below the mandible, such as for a tumor of the submandibular salivary gland, would put one at risk for this type of injury.

**(Choice 5)** Jaw asymmetry can result from unilateral paralysis of the muscles of mastication, which are innervated by the mandibular division of the trigeminal nerve (V3). V3 exits the cranium via the foramen ovale and follows a deep course to innervate the muscles of mastication. Injury to this nerve before it reaches the muscles of mastication would require a very deep dissection.

## 282. Question

1 points

### Category: Surgery

A 25-year-old man is shot with a .22-caliber revolver. The entrance wound is in the anteromedial aspect of his upper thigh, 5 cm below the groin crease. The exit wound is in the posterolateral aspect of the thigh, halfway between the greater trochanter and the knee. He has palpable pulses in the dorsum of his foot and in the posterior tibial artery behind the malleolus. The popliteal pulse is reported as normal by one examiner, but cannot be felt by another. There is no hematoma under the entrance wound, and blood is oozing from both wounds but not at an alarming rate. He is hemodynamically stable. Neurologic examination of the leg is normal. X-ray films show the femur to be intact. In addition to local wound care and the appropriate tetanus prophylaxis, which of the following is the most appropriate next step in management?

1. ☐ Digital exploration of the wounds in the emergency department
2. ☐ Discharge home
3. ☐ Doppler studies or arteriogram ☐
4. ☐ Formal surgical exploration of the area in the operating room
5. ☐ Hospitalization to observe for development of complications

**INCORRECT** ☐

**The correct answer is 3.**

Anatomic proximity to major vessels is the main criterion to suspect vascular injury in gunshot wounds of the extremities. Although absent pulses and an expanding hematoma make such an injury virtually certain (and dictate the need for surgical exploration), the presence of normal pulses and the absence of a hematoma do not rule out vascular injury. Noninvasive Doppler studies or, if necessary, an arteriogram can provide the necessary reassurance.

**(Choice 1)** Massive external bleeding might be currently prevented by clots. Disturbing them in the emergency department could lead to a lot of unnecessary excitement in a place ill-equipped to deal with the problem. When vascular injuries are explored in the operating room, proximal and distal control are obtained first, before the wound itself is probed.

**(Choice 2)** If his vessels are indeed injured, sending him home would risk the development of complications, such as late bleeding, vascular occlusion from intimal flaps, or development of an AV fistula.

**(Choice 4)** Formal surgical exploration would be mandatory if he were exsanguinating, had no distal pulses, or had an expanding hematoma. When the only reason to suspect vascular injury is anatomic proximity, a less aggressive approach is indicated.

**(Choice 5)** Waiting for complications to develop would be expensive and lead to higher morbidity.

### 283. Question

1 points

#### Category: Surgery

A 55-year-old man presents to the emergency department with massive hematemesis. Physical examination reveals abdominal distention, shifting dullness on percussion of the abdomen, and spider angiomas over the face and upper chest. An emergency endoscopic examination reveals blood rapidly filling the distal esophagus. The hematemesis is most likely due to which of the following?

1. ☐ Pyloric obstruction
2. ☐ Ruptured esophageal varices ☐
3. ☐ Gastric ulcer
4. ☐ Esophageal carcinoma
5. ☐ Duodenal ulcer

**INCORRECT** ☐

**The correct answer is 2.**

The patient has cirrhosis of the liver complicated by ascites (shifting dullness in the abdomen) and portal hypertension, the latter causing esophageal varices that have ruptured, producing hematemesis. The most common cause of portal hypertension is alcoholic cirrhosis. Approximately 50% of the deaths in cirrhosis are due to ruptured varices. The left gastric coronary vein, a branch of the portal vein, normally drains blood from the distal esophagus and proximal stomach to the portal vein for drainage into the liver. However, in portal hypertension, caused by blocked blood flow due to tissue scarring, as in alcoholic cirrhosis, blood backs up into the vein causing distention (varices) and the potential for rupture. Bleeding varices cannot be diagnosed on the clinical presentation alone and require an emergency endoscopy to localize the source of bleeding. Endoscopy also is useful in therapy with variceal ligation, banding, or sclerotherapy. Ancillary management may include the use of intravenous octreotide, which decreases splanchnic blood flow and portal vein pressure. Intravenous vasopressin plus nitroglycerin may also be used; the nitroglycerine reduces the cardiac afterload and coronary artery resistance induced by the vasopressin. In recalcitrant cases, a transjugular intrahepatic portosystemic shunt (TIPS) may be required to stop the bleeding. A metal stent is inserted that connects the hepatic vein with the portal vein. This reduces portal pressure; however, it increases the risk for developing hepatic encephalopathy by increasing blood ammonia levels. Other options include caval shunting, in which the portal vein is anastomosed to the inferior vena cava (side-to-side or end-to-side), or a distal splenorenal shunt.

**(Choices 1,3 & 5)** Pyloric obstruction is associated with vomiting due to retention of food in the stomach. Hematemesis is not a feature of the disease. Although hematemesis is most frequently associated with peptic ulcer disease (most commonly duodenal ulcers followed by gastric ulcers), the endoscopic findings described are most compatible with bleeding varices.

**(Choice 4)** does not usually present with massive hematemesis. Dysphagia for solids, weakness, and weight loss are the usual presenting signs and symptoms.

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## 284. Question

**1 points**

### Category: Surgery

A 43-year-old male complains of right shoulder pain and weakness after falling on his outstretched hands two days ago. He denies any swelling or shoulder deformity. You passively abduct both his arms above his head and then ask him to bring his arms down slowly in an adducting motion. The right arm drops rapidly at the midpoint of its descent. What is the most likely diagnosis?

1. ☐ Biceps tendon tear
2. ☐ Long thoracic nerve injury

- 3. ☐ Lower brachial trunk injury
- 4. ☐ Rotator cuff tear ☐
- 5. ☐ Humeral neck fracture

**INCORRECT** ☐

**The correct answer is 4.**

This patient has an acute tear in his rotator cuff. The rotator cuff is formed by the tendons of the supraspinatus, infraspinatus, teres minor and subscapularis muscles. The supraspinatus is most commonly injured, due to repeated bouts of ischemia near its insertion on the humerus induced by compression between the humerus and the acromion. A common cause of acute rotator cuff tears is a fall on outstretched hands. Patients usually have severe shoulder pain and edema following the traumatic event and are unable to abduct the arm past 90 degrees. The drop arm test is a maneuver that can help to diagnose a rotator cuff tear. Here, the patient's arm is abducted passively to greater than 90 degrees, and the patient is then asked to lower the arm slowly. With a complete rotator cuff tear, the patient will be unable to lower the arm smoothly and it will appear to drop rapidly from near the 90 degree position.

**(Choice 1)** Rupture of the tendon of the long head of the biceps produces a positive "Popeye sign" where the biceps muscle belly becomes prominent in the mid upper arm. Weakness with supination is prominent, and forearm flexion is typically preserved.

**(Choice 2)** Injury to the long thoracic nerve causes a winged scapula due to paralysis of the serratus anterior muscle. The most common cause is iatrogenic injury during axillary lymphadenectomy.

**(Choice 3)** The lower (inferior) trunk of the brachial plexus originates from the C5 and T1 cervical roots. Injury to this trunk, which typically results from sudden upward pulling on the arm, produces Klumpke's palsy. This palsy primarily affects muscles innervated by the ulnar nerve, which supplies most of the intrinsic muscles of the hand. Weakness and atrophy of the hypothenar and interosseous muscles characterize this palsy, and a "claw hand" deformity may also result.

**(Choice 5)** A humeral neck fracture would be more likely to present with swelling, ecchymosis and crepitus over the fracture. Axillary nerve injury may be present.

285. Question

1 points

**Category: Surgery**

A 74-year-old man presents with sudden onset of extremely severe, tearing precordial chest pain that radiates to the back and migrates downward shortly after its onset. As far as the man can tell, there was no precipitating event. He is seen within an hour and is in obvious distress. He is afebrile,

but his blood pressure is 220/110mm Hg and his pulses in the upper extremities are unequal at 102/min. Chest x-ray shows a wide mediastinum. Which of the following could best establish the diagnosis?

1. ☐ ECG and cardiac enzymes
2. ☐ Gastrografin swallow followed by barium if negative
3. ☐ Spiral CT scan or MRI angiogram ☒
4. ☐ Ventilation-perfusion scan
5. ☐ Pulmonary angiogram

**INCORRECT** ☐

**The correct answer is 3.**

The clinical picture is classic for a dissecting aneurysm of the thoracic aorta. The presentation resembles that of a myocardial infarction, but it happens in hypertensive patients who develop a wide mediastinum. At one time, only an arteriogram could establish the diagnosis (at considerable risk), but noninvasive imaging is currently preferred.

**(Choice 1)** ECG and cardiac enzymes are usually done on anyone with chest pain, but the results would have been negative here. They would have ruled out infarction but would not establish the alternate diagnosis.

**(Choice 2)** Studying the esophagus with Gastrografin swallow, followed by barium if negative, would have been a good idea if the patient had vomited repeatedly before developing the chest pain and if the x-ray film had shown mediastinal air rather than a wide mediastinum.

**(Choice 4)** Ventilation-perfusion scan would actually have been the best choice if a pulmonary embolus had been suspected.

**(Choice 5)** Pulmonary angiogram might have come to mind if he had been immobilized by recent surgery and had then developed signs suggestive of pulmonary embolus: pleuritic pain, shortness of breath, hemoptysis, and distended head and neck veins. Actually, although the angiogram is supposed to be the gold standard in such cases, it is seldom done. Less invasive diagnostic means, as suggested in **(Choice 3)**, are preferred.

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286. Question

1 points

**Category: Surgery**

A 28-year-old male is brought to the emergency department after being an unrestrained passenger in a motor vehicle collision. In the ambulance on his way to the hospital, he receives 2 liters of normal saline intravenously and 5 L/min of oxygen by nasal cannula. On physical examination, his blood pressure is 100/70 mm Hg, heart rate is 120/min, and respiratory rate is 40/min. He is

agitated and moves all four extremities spontaneously. His pupils are symmetric and reactive to light. His neck veins are distended, and his trachea is deviated to the right. Which of the following is the best initial management for this patient?

1. ☐ Immediate chest x-ray to confirm pneumothorax
2. ☐ Immediate ultrasound exam to confirm pleural fluid accumulation
3. ☐ Immediate endotracheal intubation to establish an adequate airway
4. ☐ X-ray series to exclude cervical spine injury
5. ☐ Needle insertion into the second intercostal space in the left midclavicular line ☐

**INCORRECT** ☐

**The correct answer is 5.**

This patient has a left-sided tension pneumothorax. Physical examination findings that support this diagnosis include tachypnea, tracheal deviation away from the affected side, and neck vein distention. Additional findings classically seen in tension pneumothorax include decreased breath sounds and hyperresonance to percussion on the affected side. Tension pneumothorax results from injuries that create a one-way valve in the chest wall. Such wounds allow air to enter the thorax during inspiration but do not allow that air to escape during exhalation. Tension pneumothorax requires emergent treatment with needle thoracostomy. Subsequent tube thoracostomy may be performed to maintain lung expansion. In a patient who remains hemodynamically unstable following decompression of a pneumothorax, pericardial tamponade should be suspected.

**(Choice 1)** Tension pneumothorax is a clinical diagnosis requiring emergent treatment. Radiographic confirmation is not necessary; urgent needle decompression is more appropriate.

**(Choice 2)** Tamponade could cause tachycardia and jugular venous distention, but not mediastinal deviation.

**(Choice 3)** This patient is breathing spontaneously, indicating airway patency and no need for intubation.

**(Choice 4)** Cervical spine immobilization is done empirically in all trauma patients as part of the primary survey. After the patient is stabilized, the cervical spine can be cleared with radiographic studies.



A 65-year-old male is being evaluated for hip pain. The pain has been present for several months and is constant. He denies any weight loss or loss of appetite. His past medical history is significant only for high blood pressure. His temperature is 37.2 °C (98.9 °F), blood pressure is 150/88 mm Hg, pulse is 80/min and respirations are 12/min. Physical examination is unremarkable. Laboratory studies show:

**Alkaline phosphatase:** Elevated

**Gamma glutamyl transferase:** Normal

**Serum calcium:** Normal

**25 (OH)<sup>2</sup> vitamin D:** Normal

Bone scan shows increased uptake in several spots. This patient is at high risk of developing?

1. ☐ Subarachnoid hemorrhage
2. ☐ Carpal tunnel syndrome
3. ☐ Renal cell carcinoma
4. ☐ Pulmonary hemorrhage
5. ☐ Hearing loss ☐

**INCORRECT** ☐

**The correct answer is 5.**

Paget's disease of bone, also known as osteitis deformans, is a disease of unknown etiology that is characterized by disordered bone remodeling. Specifically, osteoclast activity is increased leading to drastically enhanced bone resorption. This results in accelerated osteoblast activity in an effort to rebuild the degraded bone. The result is formation of structurally inferior woven bone at various sites throughout the body. The woven bone formed in Paget disease lesions is larger than normal bone and is prone to bowing and fracture. The most common presenting symptom in patients with this condition is pain resulting from bowing or fracture of the long bones that may result in secondary arthritis of the hip or knee. Laboratory testing in patients with Paget disease of bone will typically show an increase in alkaline phosphatase and normal serum calcium and phosphorus levels. Lesions may be identified radiographically with x-rays or by bone scanning. Enlargement of the bones of the skull in this condition may cause frontal bossing, increased head size (old hats no longer fit the patient), headaches and cranial nerve palsies. Classically, hearing loss may occur due to damage to the cochlear nerve resulting from enlargement of the temporal bone and impingement in the internal auditory meatus.

**(Choice 1)** An increased risk of subarachnoid hemorrhage is associated with various diseases including Marfan syndrome, Ehlers-Danlos syndrome and moyamoya disease.

**(Choice 2)** Carpal tunnel syndrome occurs in people with occupations requiring repetitive wrist flexion as well as in acromegaly, amyloidosis and hypothyroidism.

**(Choice 3)** A predisposition for renal cell carcinoma is seen in Von-Hippel-Lindau syndrome.

**(Choice 4)** A predisposition for pulmonary hemorrhage occurs in Goodpasture syndrome.



288. Question

1 points

**Category: Surgery**

A 17-year-old man comes to the physician because a one-week history of fever and abdominal pain began with mid-abdominal pain and nausea one week ago, but he was able to continue his usual activities. However, during the past two days, the pain has become worse. It is now localized to the right iliac fossa and impairs walking. He has had two episodes of vomiting during the past several hours. His temperature is 39.4 °C (103 °F), blood pressure is 110/70 mm Hg, pulse is 90/min, and respirations are 18/min. Examination shows a tender iliac fossa mass palpated on the right side; remaining abdominal examination shows no rigidity or guarding. Which of the following is the most appropriate next step in management?

1. ☐ Immediate surgery
2. ☐ IV hydration, erythromycin and metronidazole
3. ☐ IV hydration, tetracycline and metronidazole
4. ☐ IV hydration and cefotetan ☐
5. ☐ Ciprofloxacin and vancomycin

**INCORRECT** ☐

**The correct answer is 4.**

This patient presents with symptoms and signs suggestive of complicated appendicitis. Perforation with a localized inflammatory infiltration is likely to be present. Patients who present more than five days after the onset of symptoms, and have localized right lower quadrant findings, should be treated with IV hydration, antibiotics and bowel rest. Non-operative management is usually effective. CT scan may reveal an abscess that can be drained percutaneously. Antibiotics should cover enteric gram-negative organisms and anaerobes. A second/third generation cephalosporin or a fluoroquinolone plus metronidazole are usually used. Cefotetan has a good coverage of gram-negative organisms and anaerobes; therefore, this can be used as monotherapy in this case.

**(Choice 1)** Immediate surgery in these patients increases morbidity because it often requires extensive dissection, and causes injury to other organs; therefore, it is not recommended.

**(Choices 2,3 & 5)** Other antibiotic combinations given are not adequate. Although erythromycin and vancomycin are effective against gram-positive organisms, they do not cover gram-negative organisms or anaerobes.

## 289. Question

1 points

**Category: Surgery**

A 24-year-old man is brought to the emergency department after being involved in a motor vehicle collision. He has severe low back pain. Examination shows weakness and decreased pain and temperature sensation in both legs. Fine touch, vibration, pressure and proprioceptive sensations are intact. He is immobilized and his airway, breathing and circulation are restored. Which of the following is the most appropriate next step in management of his spinal injury?

1. ☐ Immediate surgery
2. ☐ CT scan of the spine
3. ☐ Intravenous steroids ☐
4. ☐ MRI of the spine
5. ☐ Watchful observation

**INCORRECT** ☐**The correct answer is 3.**

This patient has anterior cord syndrome following spinal cord injury due to a motor vehicle accident. Anterior cord syndrome is characterized by selective damage to the corticospinal and spinothalamic tracts. These tracts course in the anterior portion of the spinal cord and transmit motor and pain / temperature sensation, respectively. Clinically, anterior cord syndrome is suggested by paralysis and loss of pain and temperature sensation below the level of injury while posterior column functions such as fine touch, vibration, pressure, and proprioception are preserved. All trauma patients should be evaluated for spinal injury. If the neurological examination is suggestive of blunt spinal cord trauma, immediate administration of high-dose intravenous steroids (methylprednisolone) is indicated.

**(Choice 1)** Immediate surgical intervention for spinal injuries is currently limited to relieving impingement on the spinal cord caused by foreign bodies, herniated disks, bony fracture fragments or an epidural hematoma.

**(Choices 2 & 4)** All patients with clinical evidence of a spinal cord injury should be imaged with CT scan to assess the bone and MRI to assess the cord and other soft tissues, such as the intervertebral disks. Treatment with intravenous corticosteroids should not be delayed for these imaging procedures.

**(Choice 5)** Watchful observation is not indicated in this patient with clinical evidence of spinal cord injury.

**Category: Surgery**

On the second postoperative day after an abdominoperineal resection for cancer of the rectum, a 72-yearold man complains of severe retrosternal pain. The pain is crushing in nature and radiates to the left arm. He also becomes short of breath and tachycardic. Except for his fresh surgical wounds and postoperative discomfort, physical examination is unremarkable. He does not have distended neck veins. Which of the following is the most appropriate next step in diagnosis?

1. ☐ Blood gases
2. ☐ Chest x-ray film
3. ☐ Pulmonary angiogram
4. ☐ Transaminase levels (ALT, AST)
5. ☐ Troponins ☒

**INCORRECT** ☐

**The correct answer is 5.**

The differential diagnosis of severe postoperative chest pain with tachycardia and shortness of breath is between myocardial infarction and pulmonary embolus. Timing offers the first clue: Myocardial infarction typically occurs within the first 2 to 3 days, whereas pulmonary embolus is more commonly seen after 5 to 7 days. Although postoperative myocardial infarction often does not have the typical chest-pain pattern, this case presents with pain of a fairly typical nature and radiations. Both ECG and enzymes are used to confirm myocardial infarction, with enzymes being more reliable.

**(Choice 1)** would be the first step to build a case for pulmonary embolus, in which case they would show hypoxia and hypocapnia. However, the timing does not suggest pulmonary embolus, and the absence of distended veins almost completely excludes that diagnosis.

**(Choice 2)** is nonspecific for either of the two diagnoses under consideration. Other problems that could be diagnosed with a chest x-ray film in this setting, such as atelectasis, pneumonia, or pneumothorax, could account for shortness of breath but not for chest pain.

**(Choice 3)** is the ultimate, "gold-standard" test for pulmonary embolus. It is seldom done clinically (ventilation-perfusion scan is more commonly used), and, as noted above, it addresses a problem that clinically has already been excluded or made much less likely.

**(Choice 4)** Transaminases would be very helpful in the differential diagnosis of jaundice, but they have no role in identifying the source of chest pain.

## Category: Surgery

A 22-year-old man is brought to the emergency department after falling from a motorbike. He has right wrist pain. His temperature is 37.1 °C (98.6 °F), blood pressure is 110/70 mm Hg, pulse is 80/min, and respirations are 17/min. He is well oriented and cooperative. His pupils are bilaterally reactive. Physical examination shows no signs of trauma except for marked tenderness in the right anatomical snuff box. An x-ray film of the wrist joint shows a radiolucent line across the waist of the right scaphoid bone. Which of the following is the most appropriate next step in management?

1. ☐ Open reduction and internal fixation of scaphoid bone
2. ☐ Percutaneous fixation of scaphoid bone
3. ☐ Send the patient home with analgesics and repeat X ray after 15 days
4. ☐ Cast immobilization for 6-12 weeks ☐
5. ☐ Advise rest, ice, compression and elevation for wrist joint

**INCORRECT** ☐

**The correct answer is 4.**

This patient has a fracture of the right scaphoid bone. Scaphoid is the most commonly fractured bone among all the carpals. It is commonly seen in young adults following a fall on the outstretched hand. Patient generally complains of pain at wrist joint. Tenderness in anatomical snuffbox is a very sensitive marker of scaphoid fracture. Fracture is most commonly located across the waist of scaphoid bone. Initial X rays may be normal or may show fine radiolucent line in non-displaced scaphoid fractures. Scaphoid views are necessary to avoid missing the scaphoid fractures. Cast immobilization is recommended in the treatment of all non-displaced scaphoid fractures (fractures < 2 mm displacement and no angulation).

**(Choice 1)** Open reduction and internal fixation is required if initial X ray shows fracture displacement.

**(Choice 2)** Percutaneous fixation is being used for non-displaced wrist fractures in certain centers as it has been shown to decrease the period of cast immobilization.

**(Choice 3)** It would have been an appropriate choice if the initial X ray shows no fracture.

**(Choice 5)** Rest, Ice, Compression and Immobilization (RICE) are the treatment for minor ligament sprain but not for fracture.

A 50-year-old man comes to the physician because of a 2-day history of constipation and not passing flatus. For the last 3 days he has been having intermittent, but worsening, right lower quadrant (RLQ) pain. He has vomited several times today and feels nauseated. Examination shows a distended abdomen with tenderness in the RLQ; there is no rebound; there are no masses or hernias; bowel sounds are absent. Rectal examination shows an enlarged prostate. An upright x-ray film of the abdomen shows gas distributed throughout the small and large bowel, and some fluid levels. After nasogastric tube placement and hydration, his temperature is 36.5 °C (97.6 °F), blood pressure is 140/80 mm Hg, pulse is 57/min, and respirations are 12/min. Laboratory studies show:

**RBC count:** 4 .5 million

**WBC:** 7,400

**Na:** 140

**K:** 3.5

**Cl:** 100

**BUN:** 15 mg/dl

**Creatinine:** 1 .0 mg/dl

**Urine:** pH 5.5

**Urine sediment:** 2 WBC and 15 RBC/high power field, and needle-shaped crystals are present.

Which of the following is the most appropriate next step in management?

1. ☐ Barium enema
2. ☐ Sigmoidoscopy
3. ☐ Colonoscopy
4. ☐ CT of abdomen ☒
5. ☐ Enteroclysis

**INCORRECT** ☐

**The correct answer is 4.**

This ileus is possibly due to a vagal reaction due to ureteral colic. Needle shaped crystals on urinalysis indicate uric acid stones. Uric acid stones, which are radiolucent, have to be evaluated by either CT of the abdomen or intravenous pyelography. CT of the abdomen is also useful to diagnose other pathology such as appendicular abscess etc. Iles will be over when the ureterolithiasis is treated. Stones less than 0.6 cm may pass spontaneously with hydration and analgesia, otherwise instrumental intervention is needed.

**(Choice 3)** Colonoscopy is not indicated for the right-sided pathology and should not be performed in acute pathology of the bowel wall because of the risk of perforation.

**(Choice 2)** There is no left sided pathology suggestive to perform barium enema or sigmoidoscopy in this patient.

**(Choice 5)** Enteroclysis is used to diagnose small bowel tumors and other pathology, which can cause intestinal obstruction.

## 293. Question

1 points

**Category: Surgery**

A 63-year-old male presents to the urgent care center with a four hour history of abdominal pain which he describes as severe, diffuse and constant. He has had one episode of non-bloody vomiting since the pain started. His past medical history is significant for coronary artery disease, diabetes, hypertension, chronic atrial fibrillation and chronic kidney disease. His current medications are lisinopril, digoxin, warfarin, metoprolol, and simvastatin and insulin glargine. On physical examination, his blood pressure is 130/70 mmHg and his heart rate is 100/min and irregular. Physical examination reveals an overweight male in moderate distress. His abdomen is diffusely tender to palpation with positive rebound tenderness. His laboratory findings are as follows:

**Hemoglobin:** 9.5 mg/dl**WBC count Platelets:** 7,500/mm<sup>3</sup>**Sodium:** 137 mEq/L**Potassium:** 4.5 mEq/L**Chloride:** 101 mEq/L**Bicarbonate:** 22 mEq/L**Glucose:** 210 mg/dl**Creatinine:** 1.8 mg/dl**INR:** 2.1**Blood digoxin level:** therapeutic

An upright abdominal x-ray shows free air under the diaphragm. Which of the following is the best initial treatment for this patient?

1. ☐ Packed red blood cell transfusion
2. ☐ Platelet transfusion
3. ☐ Vitamin K
4. ☐ Desmopressin
5. ☐ Fresh frozen plasma ☐

**INCORRECT** ☐**The correct answer is 5.**

This patient is presenting with an acute abdomen, as indicated by his rebound tenderness and subdiaphragmatic free (intraperitoneal) air on abdominal x-ray, suggesting perforation of a hollow abdominal viscus. As mortality from peritonitis increases rapidly the longer treatment is delayed, this patient requires emergent laparotomy. In addition to pre-operative nasogastric tube decompression, IV fluids and antibiotics, his warfarin-induced

anticoagulation must be reversed. (While his INR of 2.1 is appropriate for chronic management of atrial fibrillation, if not corrected pre-operatively, it will predispose the patient to intraoperative and post-operative bleeding complications.) The most rapid means of normalizing the prothrombin time is restoration of the vitamin K-dependent clotting factors through an infusion of fresh frozen plasma (FFP).

**(Choice 1)** The patient does have anemia, and the decision to transfuse patients pre-operatively is based on underlying risk factors for ischemic heart disease and anticipated blood loss during surgery. In general, tissue oxygen delivery does not become deficient until the hemoglobin drops below 7g/dl. Transfusion is often not required in patients with chronic anemia.

**(Choice 2)** Platelet counts greater than 50,000/mm<sup>3</sup> provide adequate hemostasis for most invasive procedures.

**(Choice 3)** Vitamin K administration will correct the coagulation time in warfarin-treated patients if the drug is also stopped, but this mode of anticoagulation reversal is not appropriate for emergency situations as vitamin K's reversal effects depend on synthesis of new vitamin K-dependent clotting factors (II, VII, IX, and X) by the liver, which takes time.

**(Choice 4)** Desmopressin (DDAVP) is given pre-operatively to patients with mild hemophilia A in order to prevent excessive bleeding. It indirectly increases factor VIII levels by causing vWF release from endothelial cells.

#### 294. Question

1 points

##### Category: Surgery

A 23-year-old male is brought to the emergency department after a motor vehicle accident. He was an unrestrained driver. He was found unresponsive at the scene of the accident, and was intubated by the paramedics. He has received 2L of normal saline over the last 20 minutes. His blood pressure is 80/40 mm Hg, and heart rate is 120/min. He responds to strong vocal and tactile stimuli by opening his eyes. His pupils are equal and reactive to light. His neck veins are distended. There are multiple bruises involving the anterior chest and upper abdomen. His chest x-ray shows a small, left-sided pleural effusion and normal cardiac contours. Which of the following is the most likely diagnosis?

1. ☐ Lung contusion
2. ☐ Aortic rupture
3. ☐ Esophageal rupture
4. ☐ Pericardial tamponade ☐
5. ☐ Bronchial rupture



**INCORRECT** ☐

**The correct answer is 4.**

The victim described has sustained blunt thoracic trauma. He has tachycardia and hypotension that has not responded to a large bolus of IV fluid. His jugular venous distention indicates adequate intravascular volume status, thus severe hemorrhagic shock is an unlikely cause for the patient's state. The patient is therefore most likely suffering from an injury to the heart, specifically one that is preventing adequate movement of blood through the heart and into the arterial circulation. Cardiogenic shock occurs when the heart is unable to generate sufficient cardiac output to meet the metabolic demands of the tissue. Causes of cardiogenic shock following trauma include cardiac tamponade, severe cardiac contusion, arrhythmia and myocardial infarction. Treatment of acute cardiac tamponade is by immediate decompression with pericardiocentesis or pericardiotomy.

**(Choice 1)** Blunt thoracic trauma may also cause a lung contusion. The amount of blood lost into the pleural space following a pulmonary contusion can vary from little to severe. Severe exsanguinating hemothorax is not evident on the patient's chest x-ray, and severe blood loss would not cause jugular venous distention.

**(Choice 2)** Most patients with aortic rupture die in the field. Those that survive to the emergency department typically have suffered an injury of the aorta just distal to the left subclavian vein. Such injuries may be contained as hematomas within the mediastinum. This form of aortic rupture typically causes hypertension due to visceral afferent reflexes and a pseudocoarctation syndrome. An aortic rupture would not cause jugular venous distention.

**(Choice 3)** An esophageal rupture does not cause massive blood loss or cardiac pump failure, and would therefore not acutely result in shock unresponsive to standard fluid resuscitation. Esophageal rupture typically presents with severe retrosternal chest pain and mediastinal free air on chest x-ray.

**(Choice 5)** Bronchial rupture can also result from blunt thoracic trauma and cause jugular venous distention (if responsible for a tension pneumothorax), but this condition would be evident on the patient's chest x-ray.

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295. Question

1 points

**Category: Surgery**

A 15-year-old boy is brought to the physician because of a 15-day history of painful swelling of the right knee. The swelling and redness were immediate after hitting his knee on the door, but have not subsided after 15 days of ibuprofen. He states the pain is increasing. He has no other complaints. His temperature is 37.1 °C (98.9 °F), blood pressure is 110/75 mm Hg, pulse is 80/min, and respirations are 22/min. Laboratory studies show a normal ESR and elevated serum alkaline phosphatase. Examination shows the skin is warm and non-tender. An x-ray film of the femur and the knee joint shows an osteolytic lesion of the distal femur along with periosteal inflammation. Which of the following is the most likely diagnosis?

1. ☐ Osteosarcoma ☒
2. ☐ Ewing's sarcoma
3. ☐ Chronic osteomyelitis
4. ☐ Osteoclastoma
5. ☐ Septic arthritis

**INCORRECT** ☐

**The correct answer is 1.**

Osteosarcoma is the most common primary malignancy of bone. The incidence of this malignancy is highest in the second decade of life, and it most commonly occurs at sites of rapid bone growth, such as the metaphyses of the distal femur, proximal tibia and proximal humerus. Patients typically present complaining of persistent bone pain that may be worse at night. Systemic manifestations are rare and pathologic fractures are uncommon. The ESR is normal while the serum alkaline phosphatase is elevated. X-ray shows a destructive lesion and periosteal new bone formation with periosteal elevation (Codman's triangle). A spiculated "sunburst" pattern within the tumor may also be seen radiographically.

**(Choice 2)** Ewing's sarcoma is also most common in the second decade of life. It is a small, round, blue cell (neuroectodermal) malignancy classically associated with systemic features such as fever, malaise and weight loss. It typically affects the diaphyses of long bones as well as the spine and pelvis. X-ray shows an osteolytic lesion with onion-skin appearance.

**(Choice 3)** Chronic osteomyelitis may present with painful swelling, fever and laboratory abnormalities including an elevated ESR and leukocytosis. Chronic osteomyelitis most commonly results from contiguous spread of infection from an adjacent site, such as the skin. This is commonly seen in diabetic foot ulcers.

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296. Question

1 points

**Category: Surgery**

A 14-year-old girl has a firm, movable, rubbery mass in her left breast. The mass was first noticed 6 months ago and has since grown to about 6 cm in diameter. Which of the following is the most likely diagnosis?

1. ☐ Cancer of the breast
2. ☐ Cystosarcoma phyllodes
3. ☐ Fibrocystic disease (mammary dysplasia)

- 4. ☐ Giant juvenile fibroadenoma ☒
- 5. ☐ Intraductal papilloma

**INCORRECT** ☐

**The correct answer is 4.**

Rubbery, movable breast masses in young women are fibroadenomas, and a rapidly growing variant is known to affect adolescents.

**(Choice 1)** Cancer is virtually unknown in this age group.

**(Choice 2)** Cystosarcoma phyllodes grows to very large size, but it does so over a period of several years. It starts in women in their early or mid twenties, and reaches large size by the time they are in their late twenties or early thirties.

**(Choice 3)** Mammary dysplasia is typically seen in women aged 20-40. It is characterized by painful breasts and recurrent formation of cysts.

**(Choice 5)** Intraductal papilloma is the least likely answer. Those tumors produce bloody nipple discharge, and their size is measured in millimeters.

297. Question

**1 points**

**Category: Surgery**

A 35-year-old male presents with complaints of muscle weakness and sensory loss in his upper extremities. His medical history is significant for involvement in a motor vehicle accident seven years ago in which he sustained a whiplash cervical spine injury. Physical examination today reveals moderate wasting of the small hand muscles and impaired pain and temperature sensation in the bilateral upper extremities. Light touch, vibration, and position senses are all intact. Which of the following is the most likely diagnosis?

- 1. ☐ Amyotrophic lateral sclerosis
- 2. ☐ Syringomyelia ☒
- 3. ☐ Cervical spondylosis
- 4. ☐ Intervertebral disk prolapse
- 5. ☐ Multiple sclerosis

**INCORRECT** ☐

**The correct answer is 2.**

This patient's upper extremity sensory deficits and weakness are best explained by syringomyelia, a disease process in which CSF drainage from the central canal of the spinal cord is disrupted, leading to a fluid filled cavity that compresses surrounding neural tissue. Damage most often involves the crossing fibers of the spinothalamic tract (pain and temperature) and upper extremity motor fibers, due to their medial locations within the corticospinal tract. The most common causes of syringomyelia are Arnold Chiari malformations and prior spinal cord injuries (SCIs). In fact, 3-4% of SCI patients go on to develop syringomyelia. In cases of syringomyelia caused by SCI, the cervical level of the cord is most often involved. Symptoms develop months or years after the initial injury, and progression is gradual. Classically, the injury is a motor vehicle accident with whiplash. Characteristic physical exam findings include decreased strength and diminished pain and temperature sensation affecting the arms/hands or having a cape-like distribution, with preservation of dorsal column function (light touch, vibration, position sense).

**(Choice 1)** ALS causes upper and lower motor neuron deficits with no loss of sensory function. Twitching, muscle weakness, and cramping are common symptoms.

**(Choice 3)** Cervical spondylosis results from disc degeneration in patients over age 40. Neck pain and stiffness are the most common symptoms. Patients may develop spinal stenosis, resulting in neurologic deficits.

**(Choice 4)** A herniated cervical disc may cause unilateral radiculopathy from compression of the nerve root. Unilateral pain and weakness in the distribution of the involved nerve is likely, but dissociated sensory findings will not occur.

**(Choice 5)** Multiple sclerosis is a demyelinating disease that presents with random, asymmetric white matter lesions. Nystagmus and scanning speech are common symptoms. A relapsing-remitting course is common, and at least two separate lesions are required for diagnosis. This patient's symptoms are explained by one lesion.

298. Question

1 points

**Category: Surgery**

A one-year-old boy is brought to the emergency department with scalds on both the buttocks and thighs. His mother states that the child was burned because she accidentally drew a bath for the child with water that was too hot. She states the injury occurred 2 days ago. On examination, the child is irritable. Second-degree burns are noted on the buttocks, genitalia, waist, proximal thighs and feet. There is an abrupt demarcation between the burned and unaffected skin. A faint yellow patch of discoloration is noted on the left thorax with a slight violaceous hue. The child has not yet had his 1-year vaccinations. Which of the following is the most appropriate next step in management?

1. ☐ Give wound care instructions and send the patient home with analgesics
2. ☐ Admit the patient and do a skeletal survey ☐

3. ☐ Give wound care instructions and advise the mother that she should keep the temperature of the water heater below 140 F to avoid such injuries in future
4. ☐ Ask the mother if the child is being abused
5. ☐ Advise the mother of the suspected abuse, but do not notify authorities because this is a violation of patient confidentiality

**INCORRECT** ☐

**The correct answer is 2.**

Over 1 % of children in the Australia are victims of child maltreatment, which can take on many forms including physical or sexual abuse, psychological abuse, and neglect or Munchausen disease by proxy. Most cases of child abuse that present for medical evaluation will enter the medical system via the emergency department. Emergency physicians must maintain a high index of suspicion for abuse. To reinforce the need for reporting, many local authorities have implemented policies including fines or imprisonment for failing to report suspected abuse to child protective services. Factors that may indicate child abuse include but are not limited to the following:

1. Patterned scalds and burns indicative of forceful immersion or the use of a hot object such as a cigarette or curling iron
2. Incoherent or improbable explanation of the injuries
3. Delay in seeking care after the injury
4. Fractures of the long bones or ribs, fractures in various stages of healing
5. Bruising on areas other than those overlying bony prominences
6. Suspicious bruises include those on the thighs, abdomen, cheeks and genitalia
7. Patterned bruising such as loops from a cord or belt or imprints of a hand
8. Subdural hematoma and retinal hemorrhages in very young infants
9. Inappropriate affect of the caregiver

In any case of suspected child abuse, the physician should do the following:

1. Perform a thorough physical examination and obtain a radiographic skeletal survey in order to identify and document any signs of abuse.
2. Report the case to child protective services
3. Admit the patient to ensure their safety

In the case described, the wounds are most consistent with an intentional immersion burn. These burns classically show a sharp demarcation between the burned and unburned skin and sparing of the bilateral gluteal regions because these are typically firmly pressed against the bottom of the tub thereby preventing burning. Additionally, the mother's story is inconsistent with the injuries and she has delayed seeking medical care for 2 days.

**(Choices 1 & 3)** The child should never be sent home in cases of suspected child abuse. It is mandatory to report the case to child protective services and hold the patient in the hospital. Maintaining the water temperature below 140 °F helps prevents scalds in most of the cases.

**(Choice 4)** The caregiver should never be confronted in case of suspected child abuse. They should simply be informed that abuse is suspected and will be investigated by the appropriate authorities. Accusations should not be made by the physician.

**(Choice 5)** Physicians are mandatory reporters for suspected child abuse or domestic abuse. It is illegal to not report such incidents.

299. Question

1 points

**Category: Surgery**

A 78-year-old man comes to the physician because of a bloody urethral discharge for 3 days. He has had increasing frequency of urination and hesitancy for the past 2 years, but these symptoms have never been severe enough to require medical attention. Digital rectal examination reveals a slightly enlarged and firm prostate. Expressed prostatic secretions are negative for bacteria and leukocytes. Collection of clean catch urine in separate aliquots reveals initial hematuria, with blood present in the first 5 mL. Which of the following is the most likely diagnosis?

1. ☐ Gonococcal infection
2. ☐ Nonbacterial prostatitis
3. ☐ Prostatic carcinoma
4. ☐ Testicular cancer
5. ☐ Urethral carcinoma ☐

**INCORRECT** ☐

**The correct answer is 5.**

Bloody urethral discharge in an old man is highly suspicious of urethral carcinoma. This is a rare cancer, but an early diagnosis allows a good chance of cure. If gross hematuria is the initial presentation, discrimination between upper tract, lower tract (vesical), and urethral sources may be obtained by evaluation of the timing of hematuria. A clean-catch urine is collected in separate aliquots. The last few milliliters are collected after performing prostatic massage to obtain prostatic secretions. Initial hematuria is characteristic of urethral lesions, midstream or total hematuria results from upper urinary tract and vesical sources, and terminal hematuria reflects prostatic disease.

**(Choice 1)** manifests with a yellow (purulent) discharge, which is most abundant in the early morning. The discharge contains numerous neutrophils with gram-negative diplococci.

**(Choice 2)** results in chronic suprapubic pain or discomfort. Hematuria is usually absent. Microscopic examination of prostatic secretions reveals more than 10 leukocytes per high power field, but cultures are negative. The pathogenesis of this condition is probably noninfectious.

**(Choice 3)** is most commonly detected by digital rectal examination and/or abnormally elevated serum prostatic-specific antigen (PSA). If hematuria is present, it is of the terminal type, i.e., present in the last aliquot of a fractionated urine collection.



**(Choice 4)** does not manifest with bloody urethral discharge or hematuria. Its most frequent presenting sign is painless enlargement of the testis.

300. Question

1 points

**Category: Surgery**

A 53-year-old male is brought to the emergency room after a high-speed motor vehicle accident. He was an unrestrained driver and admits to consuming a moderate amount of alcohol before driving. In the ER, he complains of bilateral chest pain and left leg pain. His past medical history is significant for emphysema, diabetes mellitus and remote drug abuse. A traumatic fracture of the left femur is evident on physical examination. His initial arterial blood gas analysis shows a pH of 7.45,  $pO_2$  of 81 mm Hg and  $pCO_2$  of 32 mm Hg. His pulmonary capillary wedge pressure is 10 mm Hg. After a 2000 ml IV fluid challenge, his  $pO_2$  is 76 mmHg and his pulmonary capillary wedge pressure is 12 mmHg. Chest x-ray shows alveolar opacities over the right and left lower lobes. Hours after the accident, he complains of continued chest pain and shortness of breath. Which of the following diagnoses is most likely responsible for his shortness of breath?

1. ☐ Aspiration pneumonia
2. ☐ Hemothorax
3. ☐ Pulmonary contusion ☒
4. ☐ Myocardial contusion
5. ☐ Aortic rupture

**INCORRECT** ☐

**The correct answer is 3.**

This patient complains of continued chest pain and dyspnea hours after a high-speed motor vehicle accident (MVA). An unrestrained driver, he most likely sustained significant blunt trauma to the chest secondary to impact with the steering wheel. His clinical presentation and x-ray findings are consistent with bilateral pulmonary contusions. Pulmonary contusion is often not clinically evident immediately following an injury and initial radiographic studies may be negative. Patients typically develop hypoxia and respiratory distress hours later as pulmonary edema sets in. Administration of large volumes of IV fluid may hasten this process. This patient's respiratory alkalosis and hypocarbia are secondary to hyperventilation, itself driven by hypoxia. Pulmonary contusion complicates 30-75% of cases of severe blunt chest trauma. MVAs with associated rapid deceleration are a common cause. Management involves close monitoring and intubation with mechanical ventilation in severe instances.



**(Choice 1)** Aspiration of gastric contents is possible, but would be more likely if there was a history of the patient having vomited in the field. In aspiration, fluid challenge would not ordinarily exacerbate the hypoxia. Given this patient's history, pulmonary contusion is more likely.

**(Choice 2)** The patient's chest x-ray shows no sign of hemothorax.

**(Choice 4)** Myocardial contusion can occur secondary to blunt thoracic trauma, but is asymptomatic in most cases. In symptomatic cases, presenting complaints may include arrhythmia, heart failure and chest pain. Cardiac rupture is an uncommon manifestation. If myocardial contusion were the cause of this patient's shortness of breath, the PCWP would have been increased to much higher levels.

**(Choice 5)** Radiographic signs of aortic rupture include mediastinal widening, depression of the left main bronchus, displacement of the trachea and esophagus to the right, and obliteration of the aortic knob shadow. These are not present in the x-ray described.

### 301. Question

1 points

#### Category: Surgery

A 25-year-old man presents with a painless, hard, 3-cm testicular mass that he discovered serendipitously while taking a shower. Physical examination confirms that the mass arises from the testicle itself, is not part of the epididymis, and is solid rather than a fluid collection. The rest of the physical examination is unremarkable. Which of the following would be the most appropriate next step?

1. ☐ Serum levels of alpha-fetoprotein and beta human chorionic gonadotropin
2. ☐ Trans-scrotal needle biopsy of the mass
3. ☐ Trans-scrotal incisional biopsy at the edge of the mass
4. ☐ Trans-scrotal orchiectomy
5. ☐ Radical inguinal orchiectomy ☐

**INCORRECT** ☐

**The correct answer is 5.**

To the uninitiated, this is a drastic step that smacks of "shoot first, ask questions later," However, virtually all solid testicular masses are malignant tumors. The best way to avoid dissemination is to open the inguinal canal, do a high ligation of the cord, and pull the testicle out.

**(Choices 1)** Serum markers are indeed taken prior to surgery, but it is done primarily to facilitate follow up. It is true that elevated levels confirm the presence of tumor, but they do not provide precise information as to the exact cellular mix of the tumor, which is essential to

plan therapy. The exact cellular mix will also not be determined with a fine needle aspiration. **(Choices 2,3 & 4)** The trans-scrotal approach, regardless of how minor, intermediate, or complete, is universally condemned because it spreads the tumor even as one is sampling it.

302. Question

1 points

**Category: Surgery**

A pedestrian is hit by a car. Physical examination shows the leg to be angulated midpoint between the knee and the ankle. X-ray films confirm fractures of the shaft of the tibia and fibula. Satisfactory alignment is achieved by external manipulation, and a long leg cast applied. In the ensuing 8 hours, the patient complains of increasing pain. When the cast is removed, the pain persists, the muscle compartments feel tight, and there is excruciating pain with passive extension of the toes. Which of the following is the most appropriate next step in management?

1. ☐ Re-casting with a looser cast
2. ☐ Nerve block prior to re-casting
3. ☐ Arteriogram
4. ☒ Fasciotomy
5. ☐ Open reduction and internal fixation

**INCORRECT** ☐

**The correct answer is 4.**

Two locations in the body have the highest risk for development of the dreaded compartment syndrome: the forearm and the lower leg. Although long-standing ischemia followed by reperfusion might be the most common cause, any injury with subsequent swelling can do it, as it did here. The classic findings are all there, including the most reliable one: excruciating pain on passive extension. Fasciotomy is the only effective therapy.

**(Choices 1 & 2)** Re-casting, with or without nerve blocks, would not address the problem of the compartment syndrome and would lead to permanent disability.

**(Choice 3)** An arteriogram is not needed to make the diagnosis. Time would be wasted, and a normal study would not exclude the diagnosis. In fact, there may even be normal palpable pulses in the presence of a compartment syndrome (pressure above 30 mm Hg in the compartment is all it takes to kill the muscles).

**(Choice 5)** As for open reduction and internal fixation, the problem in this case is not the position of the bones (it might have been if reduction could not be achieved). Furthermore, the incision needed for that operation would not necessarily open all the affected compartments widely enough. The only correct answer is fasciotomy.

### 303. Question

1 points

#### Category: Surgery

A 56-year-old man presents with progressive jaundice that he first noted 6 weeks ago. The patient has lost about 20 pounds over the past 2 months and he has persistent, nagging pain deep into his epigastrium and upper back. Except for the obvious jaundice and the signs of weight loss, physical examination is remarkable only for the presence of a vaguely palpable, nontender mass under the liver edge. His hemoglobin is 14 g/dL, and there is no occult blood in the stool. Total bilirubin is 22 mg/dL, with 16 mg/dl, direct (conjugated) fraction. The transaminases are minimally elevated, whereas the alkaline phosphatase is about 8 times the upper limit of normal. A sonogram shows dilated intrahepatic ducts, dilated extrahepatic ducts, and a much distended, thin walled gallbladder without stones. Which of the following is the most appropriate next step in diagnosis?

1. ☐ CT scan of the abdomen ☐
2. ☐ Serologies
3. ☐ Duodenal endoscopy and biopsies
4. ☐ Endoscopic retrograde cholangiopancreatography (ERCP)
5. ☐ Percutaneous transhepatic cholangiogram (PTC)

**INCORRECT** ☐

**The correct answer is 1.**

The clinical diagnosis is obstructive jaundice (high alkaline phosphatase, dilated biliary ducts), which is malignant in nature (thin walled, distended, palpable gallbladder) and probably due to cancer of the head of the pancreas (bulky tumor producing weight loss and back pain). The tumor can probably be seen in the CT scan, which is the least invasive of the proposed imaging studies.

**(Choice 2)** would be in order if we suspected hepatitis, which would be the case if the transaminases were very high, the alkaline phosphatase only modestly altered, and the ducts not dilated in the sonogram.

**(Choice 3)** would be the first choice if we suspected cancer of the ampulla of Vater, in which case there would be no pain and probably no weight loss, but there would be anemia and occult blood in the stools.

**(Choice 4)** is the first choice if stones are suspected. In that case, however, there would be a nondistended gallbladder with stones in it. When pancreatic cancer is suspected, ERCP is the next test to do if the CT scan is negative and we therefore assume either that the pancreatic cancer is very small or that there is common duct cancer.

(Choice 5) does the same as ERCP (put dye directly into the ducts) and is also invasive. If we elected to do PTC instead of ERCP, it would still be preceded in this case by the CT scan, which might render either test unnecessary.

### 304. Question

1 points

#### Category: Surgery

A 35-year-old woman presents to the physician's office after she palpated a lump in her right breast. She has no other complaints. She has not seen a doctor for 10 years. She regularly performs breast self-exams after menses. She has no significant past medical history. Her mother died of breast cancer at the age of 40. Breast examination shows a 1 x 1 cm, rubbery, firm, freely mobile round mass in the upper, outer quadrant of the right breast; no axillary lymph nodes are palpable. Which of the following is the most appropriate next step in management?

1. ☐ Observation
2. ☐ Ultrasonography
3. ☐ Excisional biopsy
4. ☐ Fine needle aspiration
5. ☐ Mammography ☐

**INCORRECT** ☐

**The correct answer is 5.**

The patient described most likely has a fibroadenoma. Fibroadenomas are common benign breast masses that classically occur in younger women. Typically examination will reveal a rubbery, firm, freely mobile mass. Malignant lesions are generally hard, irregular and fixed. Physical examination alone, however, is insufficient to differentiate benign from malignant breast lesions. Given this patient's family history of breast cancer at early age, this patient should be evaluated with a mammogram. This will also identify other occult lesions. All suspicious lesions should then be biopsied.

**(Choice 1)** Close observation is appropriate in patients less than 35 years old with no family history of breast cancer. Any change in the size or quality of the mass on follow-up should be evaluated with mammogram or biopsy.

**(Choice 2)** Ultrasound is useful in women under age 35, when a mass detected on screening mammography cannot be felt or when the patient declines aspiration of a mass.

**(Choice 3)** Excisional biopsy is indicated for fibroadenoma as it is both diagnostic and curative. However, a baseline mammogram at age 35 is recommended for any woman who has an increased risk for breast cancer, especially to evaluate for other occult lesions.

Excisional biopsy would also be indicated for any suspicious lesions found on mammography.

**(Choice 4)** FNA for cytologic evaluation of a palpable lesion or Excisional biopsy should be done for any suspicious lesions found on mammography.

305. Question

1 points

**Category: Surgery**

A 70-year-old male rushed to the emergency department because of bright red bleeding per rectum. He says his commode is full of blood and has never experienced any bleeding before. He has a history of constipation. He takes daily aspirin for prevention of stroke and hydrochlorothiazide for high blood pressure. His temperature is 36.5 °C (97.8 °F), blood pressure is 100/60 mm Hg, pulse is 120/min and respirations are 20/min. He is not hypoxic. Abdomen is soft, non-distended and non-tender; no masses or organomegaly are palpated; bowel sounds are normal. Rectal examination shows bright red blood and an enlarged prostate. Nasogastric tube aspirate shows non-bilious stomach contents without blood. An x-ray of the abdomen shows no abnormalities. Which of the following is the most likely cause of his bleeding?

1. ☐ Colon cancer
2. ☐ Ischemic colitis
3. ☐ Mesenteric thrombosis
4. ☐ Diverticulosis ☒
5. ☐ Peptic ulcer disease

**INCORRECT** ☐

**The correct answer is 4.**

Diverticulosis is the most common cause of frank hematochezia in an elderly patient. Colonic diverticula are most common in the sigmoid colon. They form due to high intraluminal pressure in the colon, which causes the mucosa and muscularis mucosa to herniate through the bowel wall at sites where it is penetrated by vasculature. Because they do not include all layers of the bowel wall, colonic diverticula are regarded as false diverticula. Chronic constipation resulting from a low fiber diet is the most common predisposing factor for diverticulosis. Due to their proximity to the bowel vasculature, diverticula may erode a penetrating artery resulting in profuse self-limited bleeding per rectum.

**(Choice 1)** Colon cancer tends to present with chronic occult blood loss. Gross bleeding is less likely though possible.

**(Choice 2)** Ischemic colitis usually occurs in the setting of hypotension, vasculitis or atherosclerotic disease, or it may follow ligation of the IMA after AAA repair. Patients typically present with abdominal pain, fever and vomiting. Bleeding occurs due to ischemia of the watershed areas of the colon, most commonly the splenic flexure.

**(Choice 3)** Acute mesenteric thrombosis presents with abdominal pain out of proportion to physical findings, nausea and vomiting and bloody diarrhea due to mucosal sloughing. Such patients have numerous atherosclerotic risk factors.

**(Choice 5)** Brisk upper GI hemorrhage can present with bright red blood per rectum, but in this case NG tube suction did not show any blood, so the bleeding from stomach is unlikely.

306. Question

1 points

Category: Surgery

A newborn infant is found to have a scrotal mass. The mass is cystic and transilluminated with light. He is born without any other complications. The vital signs are within normal limits. Other physical examination is unremarkable. Which of the following is the most appropriate next step in management?

1. ☐ Aspiration of fluid
2. ☐ Surgical intervention
3. ☐ Ultrasound examination
4. ☐ Reassurance and observation ☐
5. ☐ Check 24-hour urinary protein excretion

**INCORRECT** ☐

**The correct answer is 4.**

The patient described most likely has a hydrocele. A hydrocele is a fluid collection within the processus or tunica vaginalis – the peritoneal projection that accompanies the testis during its descent into the scrotum. When the processus vaginalis fails to obliterate, peritoneal fluid may accumulate within the processus vaginalis causing a communicating hydrocele. A collection of fluid within a tunica vaginalis that has properly obliterated its communication with the peritoneum is a noncommunicating hydrocele. Hydrocele can be differentiated from other testicular masses by transillumination; hydroceles will transilluminate while other masses will not. Most hydroceles, both communicating and noncommunicating, will resolve spontaneously by the age of 12 months and can be safely observed during that period.

**(Choice 1)** Risks of aspiration include the potential for infection and damage to nearby structures. It is not reasonable to put the patient at risk for a lesion that will likely resolve spontaneously.

**(Choice 2)** Communicating hydroceles that persist beyond 12 months of age are unlikely to resolve spontaneously and put the patient at increased risk of indirect inguinal hernia.

Surgical intervention is indicated in such cases.

**(Choice 3)** Ultrasound imaging of the mass described is not unreasonable but is not required as the diagnosis is apparent by physical exam.

**(Choice 5)** Nephrotic syndrome generally causes generalized edema. It is very unlikely in this patient.

307. Question

1 points

**Category: Surgery**

A 45-year-old male presents to his physician with persistent nausea and vomiting of partially digested food for the past month. He has also lost 5 lbs of weight during this period of time. His appetite is good but he feels full after a few bites. His past medical history is significant for a one-year history of type 2 diabetes and a suicide attempt 6 months ago in which he ingested acid. He drinks alcohol and smokes one pack of cigarettes daily. His temperature is 36.8 °C (98.2 °F), blood pressure is 110/65 mm Hg, pulse is 110/min, and respirations are 16/min. Mucous membranes are dry. Examination shows succussion splash on the epigastrium. Which of the following is the most likely diagnosis?

1. ☐ Diabetic gastroparesis
2. ☐ Esophageal stricture
3. ☐ Duodenal carcinoma
4. ☐ Duodenal hematoma
5. ☐ Pyloric stricture ☐
6. ☐ Esophageal dysmotility

**INCORRECT** ☐

**The correct answer is 5.**

This patient's history of a 5 lb weight loss over one month, non-bilious vomit containing partially digested food, persistent nausea and vomiting with early satiety, and dehydration are all consistent with a diagnosis of gastric outlet obstruction. Abdominal succussion splash indicates the presence of hollow viscus filled with both fluid and gas. The major causes of gastric outlet obstruction include peptic ulcer disease, strictures secondary to ingestion of caustic agents, pyloric stenosis, and pancreatic cancer. Diabetic gastroparesis can also have a similar presentation. The fact that this patient ingested acid six months ago makes pyloric stricture the most likely diagnosis.



**(Choice 1)** Diabetic gastroparesis tends to occur in patients who have had diabetes for greater than a decade. This patient was diagnosed with diabetes only one year ago.

**(Choices 2 & 6)** Esophageal stricture/dysmotility tends to present with dysphagia, which is not a presenting symptom of this patient. In addition, abdominal succussion splash is not a finding in those with esophageal stricture/dysmotility.

**(Choice 3)** Duodenal carcinoma can cause gastric outlet obstruction. It is a rare form of cancer and given the patient's history, the likelihood of pyloric stricture is far greater.

**(Choice 4)** This patient's history does not suggest any blunt trauma, which is the usual cause of duodenal hematoma.

308. Question

1 points

Category: Surgery

A 31-year-old male presents to your office with pain and swelling over his coccyx. He has never had symptoms like this before. His past medical history is significant for an appendectomy two years ago and acute pyelonephritis one year ago. Which of the following is the most likely diagnosis?

1. ☐ Perianal abscess
2. ☐ Pilonidal disease ☐
3. ☐ Crohn's disease
4. ☐ Suppurative hidradenitis
5. ☐ Bowen's disease

**INCORRECT** ☐

**The correct answer is 2.**

Acute pain and swelling of the midline sacrococcygeal skin and subcutaneous tissues is most commonly due to infection of a pilonidal cyst. Pilonidal cysts are most prevalent in young males, particularly those with larger amounts of body hair. The precise etiology of pilonidal cysts and sinuses is not clearly described, but they are believed to develop following chronic activity involving sweating and friction of the skin overlying the coccyx within the superior gluteal cleft. Infection of hair follicles in this region may spread subcutaneously forming an abscess that then ruptures forming a pilonidal sinus tract. The chronic sinus tract may then collect hair and debris resulting in recurrent infections and foreign-body reactions. When the sinus becomes acutely infected, pain, swelling, and purulent discharge occur in the midline postsacral intergluteal region. Treatment is by drainage of abscesses and excision of sinus tracts.

**(Choice 1)** A perianal abscess presents with anal pain and a tender, erythematous bulge at the anal verge. This patient's pain and swelling are located superior to the anus over the coccyx in the midline postsacral intergluteal cleft.

**(Choice 3)** A perianal fistula due to chronic anal crypt infection or Crohn's disease would have an external (cutaneous) opening draining purulent material. Perianal fistulae are generally located within 3 cm of the anal margin. In adults, the coccyx is located at least 5 cm above the anus.

**(Choice 4)** Suppurative hidradenitis (hidradenitis suppurativa), pilonidal disease, dissecting folliculitis of the scalp and acne conglobata are members of the follicular occlusion tetrad. Affected patients present with multiple painful nodules and pustules of the axillae and groin. These lesions lead to sinus formation and fibrosis.

**(Choice 5)** Bowen's disease is squamous cell carcinoma in situ of the skin. It typically presents as a thin erythematous plaque with well-defined irregular borders and an overlying scale or crust.

309. Question

1 points

Category: Surgery

A window cleaner falls from a third-story scaffold and lands on his feet. Physical examination and x-rays show comminuted fractures of both calcaneus. He is tender to palpation over multiple bruises and abrasions in other parts of his trunk and extremities, but he has normal vital signs and a normal neurologic exam. Given the mechanism of injury, which of the following is the most appropriate next step in diagnosis?

1. ☐ Abdominal CT scan
2. ☐ Cervical spine x-ray films
3. ☐ X-ray films of thoracic and lumbar spine ☐
4. ☐ Appropriate arteriograms
5. ☐ Retrograde urethrogram

**INCORRECT** ☐

**The correct answer is 3.**

The direction of force that produces a fracture often predicts the possibility of other less obvious injuries. The vertical fall depicted in this vignette classically results in compression fractures of thoracic and lumbar vertebral bodies. The patient is distracted by the pain in his feet, but the physician must look for those additional injuries. Alternative answers would have been appropriate under different circumstances:

**(Choice 1)** CT scan of the abdomen is used to assess intra-abdominal injuries in a patient with blunt abdominal trauma who has signs of bleeding but is hemodynamically stable.

**(Choice 2)** Cervical spine x-ray films are always a top priority in multiple injury patients, but the triggering findings are head or facial injuries and a tender neck, none of which are present here.

**(Choice 4)** An arteriogram is needed in posterior dislocation of the knee.

**(Choice 5)** A retrograde urethrogram is an appropriate study in a patient with a pelvic fracture and blood at the meatus.

### 310. Question

1 points

#### Category: Surgery

A 55-year-old man comes to the physician because of a 4-month history of an ulcer on the sole of his right foot. He has had no trauma and does not remember how he got the ulcer. He states the ulcer has been difficult to heal and readily gets infected. He does not use tobacco, alcohol or drugs. Examination shows the ulcer is located on the sole of his foot just below the head of the first metatarsal bone. His foot is warm and dry and appears slightly deformed. Dorsalis pedis pulses are present. Which of the following is the most likely cause of his condition?

1. ☐ Venous hypertension
2. ☐ Arterial spasm
3. ☐ Peripheral neuropathy ☒
4. ☐ Central spinal cord lesion
5. ☐ Posterior spinal cord lesion

**INCORRECT** ☐

**The correct answer is 3.**

Diabetic foot ulcers occur due to three derangements present in all diabetics: neuropathy, microvascular insufficiency and relative immunosuppression. Diabetic foot ulcers typically occur on the sole of the foot on high-pressure weight bearing sites, such as below the head of the first metatarsal. Peripheral neuropathy renders the foot and ankle relatively insensate. Due to this inability to sense minor foot trauma and foot pain due to high pressure on the skin, patients with diabetes are predisposed to ulcer formation at these sites. Poor perfusion due to microvascular insufficiency also promotes ulcer formation and predisposes to poor wound healing. Immunosuppression predisposes to infection of these wounds, which may not only slow healing but may also predispose to osteomyelitis. Peripheral neuropathy has also likely caused a Charcot joint in the patient described above.

**(Choice 1)** Ulcers resulting from venous insufficiency (venous valvular incompetence) typically occur on the medial aspect of the leg above the medial malleolus. Such ulcers are often preceded by chronic lower extremity edema and stasis dermatitis.

**(Choice 2)** Raynaud disease I phenomenon is characterized by arterial spasm in response to cold or emotional stress causing discoloration and discomfort of the distal digits. Raynaud phenomenon may ultimately result in distal digital gangrene if severe.

**(Choice 4)** Syringomyelia classically presents with central cord syndrome. Central cord syndrome is characterized by weakness of the upper extremities and loss of pain and temperature sensation in a “cape like” distribution over the neck, shoulders, upper arms and hands. Patients may present with burn injuries on the hands due to loss of sensation.

**(Choice 5)** Neurosyphilis may cause tabes dorsalis, a lesion of the posterior spinal cord characterized by loss of proprioceptive sensation from the legs, ataxia and paresthesias.

### 311. Question

1 points

#### Category: Surgery

A 54-year-old alcoholic man comes to the emergency department because of dysphagia, drooling and a fever. He has been sick for two days and has not been able to eat. His mouth is swollen and feels hot. Examination shows a pale, febrile man who is drooling. There is redness around the entire mouth extending into the floor of the mouth. A tender, symmetric and indurated swelling with palpable crepitus is present in the submandibular area. Laboratory study shows an elevated WBC count. Which of the following is the most likely source of the oral cavity infection?

1. ☐ Blood
2. ☐ Lungs
3. ☐ Parotid gland
4. ☐ Teeth ☐
5. ☐ Tonsils

**INCORRECT** ☐

**The correct answer is 4.**

Ludwig angina is a rapidly progressive bilateral cellulitis of the submaxillary and sublingual spaces. The infection classically arises from an infected second or third mandibular molar; the organisms that typically cause this process are Streptococcus and anaerobes. Patients present with fever, dysphagia, odynophagia and drooling. These symptoms result from swelling of the submandibular space and posterior displacement of the tongue. Physical examination reveals firm induration of the submandibular space; the presence of anaerobes

may cause crepitus due to gas formation. The most common cause of death is asphyxiation. Patients should be monitored for respiratory difficulty and intubated if necessary. Antibiotics and removal of the infected tooth is the treatment of choice.

**(Choice 1)** Hematogenous spread is a common cause of endocarditis, osteomyelitis, muscle abscesses and septic joints.

**(Choice 2)** The lungs are typically not affected by Ludwig angina. Asphyxiation in Ludwig angina may result from constriction of the upper airway by the infectious process and resulting edema

**(Choice 3)** The parotid gland is located on the lateral face superficial to the masseter muscle. It is not affected in Ludwig angina. The parotid may be primarily infected by the mumps virus or by Staphylococcus or Streptococcus following parotid duct obstruction.

**(Choice 5)** The tonsils are normal in Ludwig's angina. Group A  $\beta$ -hemolytic Streptococcus is the most common primary infection of the tonsils.

### 312. Question

1 points

#### Category: Surgery

A 75-year-old woman is brought to the emergency department after falling early in the morning. She is unable to move her right leg and has severe pain in her right hip. Her temperature is 36.9 °C (98.6 °F), blood pressure is 90/50 mm Hg, pulse is 100/min and respirations are 16/min. Examination shows the right lower extremity is shortened and is externally rotated with marked limitation of hip movement on the right side. An x-ray of the hip shows a markedly displaced fracture of the neck of the right femur. After hemodynamically stabilizing the patient, which of the following is the most appropriate step in management?

1. ☐ Closed treatment in a spica cast
2. ☐ Internal fixation of the fracture
3. ☐ Closed reduction and external fixation
4. ☐ Lower limb skeletal traction
5. ☐ Perform a primary arthroplasty ☐

**INCORRECT** ☐

**The correct answer is 5.**

Femoral neck fractures are intracapsular fractures and are most commonly seen in postmenopausal females and males over 70 years of age. The patient will classically present following a fall with inability to ambulate and hip pain. On exam, the involved limb is shortened and externally rotated. Active and passive range of motion of the affected limb elicits pain. The diagnosis can be made with AP and lateral X-rays of the hip, and classification of the

fracture using the Garden classification system may then be made based on radiographic findings as follows:

Type 1: Valgus impaction of femoral head.

Type 2: Complete but non-displaced femoral neck fracture.

Type 3: Complete fracture with displacement 50%.

Type 1 or stress fractures can be managed non-operatively with toe-touch weight bearing on crutches until there is radiological evidence of complete healing. Garden types 2, 3 and 4 are unstable fractures and require open reduction and internal fixation or a primary arthroplasty as soon as the patient is stabilized. Elderly patients and those with severely displaced femoral neck fractures, such as the patient described in the question stem who has a Garden type 4 fracture, are preferentially treated with arthroplasty. Arthroplasty is preferred because the risk of avascular necrosis of the femoral head is high, even following open reduction and internal fixation. due to the tenuous blood supply of the femoral head.

**(Choice 1)** Closed treatment in a spica cast almost always results in nonunion.

**(Choice 2)** Internal fixation is preferentially used for Garden type 2 or 3 fractures in young patients in an effort to save the femoral head.

**(Choice 3)** Closed reduction and external fixation is not recommended for displaced femoral neck fractures because the reduction is not satisfactory and there is a high chance of nonunion or avascular necrosis of head of femur.

**(Choice 4)** Lower limb traction as a means of definitive treatment of fracture of neck of femur is associated with prolonged immobilization and significant morbidity associated with immobilization.

### 313. Question

1 points

#### Category: Surgery

A 34-year-old man is brought to the emergency department after being rescued from a burning building. His temperature is 36.9°C (98.6°F), blood pressure is 90/60 mm Hg, pulse is 100/min and respirations are 28/min. Examination shows second and third degree burns over 15% of his body. His oropharynx shows erythema and scattered blisters. His lungs are clear to auscultation and his abdomen is soft and nondistended. His blood carboxyhemoglobin concentration is 20%. Which of the following is the best management for this patient?

1. ☐ High-dose corticosteroids
2. ☐ Endotracheal intubation ☒
3. ☐ Broad-spectrum antibiotics
4. ☐ Fluid restriction
5. ☐ Acetylcysteine inhalation



**INCORRECT** ☐

**The correct answer is 2.**

The initial management of burn injuries is identical to the management of all trauma patients – airway, breathing and circulation must always be secured first. Burn victims are at high risk for respiratory compromise because the supraglottic airway, which efficiently exchanges heat with inhaled air, is very susceptible to direct thermal injury and acute obstruction by edema and blistering. (In contrast, the subglottic airway is protected from injury by reflexive closure of the vocal cords upon exposure to extremely hot air.) Clinical indicators of thermal and smoke inhalation injury include: burns on the face, singeing of the eyebrows, oropharyngeal inflammation, blistering or carbon deposits, carbonaceous sputum, stridor, carboxyhemoglobin level > 10%, and a history of confinement in a burning building. All burn victims should be treated initially with high-flow oxygen via a non-rebreather mask, though caregivers should maintain a low threshold for intubation in any patient with physical evidence of thermal damage to the upper airway. A key reason for early intubation is that progressive airway edema may preclude intubation later in the patient's clinical course, potentially necessitating an emergent surgical airway.

**(Choice 1)** High-dose steroids are not used in the acute treatment of burn wounds. The diabetogenic and immunosuppressive effects of systemic steroids make them contraindicated in severely burned patients, who are already at high risk for metabolic derangement and immunosuppression as a result of their injuries.

**(Choice 3)** Prophylactic antibiotics are not indicated in the acute management of this patient. While burn patients are at high risk for infection, especially by *P. aeruginosa*, treatment in the acute setting should focus on restoration of airway, breathing and circulation.

**(Choice 4)** Fluid restriction is never indicated in burn patients. Following severe thermal burns, patients require significant volume replacement to compensate for fluid lost through their wounds as well as for a potential injury-related systemic inflammatory response (shock).

**(Choice 5)** N-acetylcysteine is the antidote for acetaminophen-induced hepatotoxicity. It is also used as a mucolytic agent in cystic fibrosis and to prevent radiocontrast nephropathy in patients with renal insufficiency undergoing CT scans with intravenous contrast. There are case reports to suggest that this agent may also be of value in treating carbon monoxide poisoning, however this intervention would always come second to airway protection by intubation.

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314. Question

1 points

**Category: Surgery**

A 40-year-old male involved in an auto-versus pedestrian accident arrives in the ER. The patient's vital signs are T 36.5°C, HR 140, and BP 85/40. The GCS is 15. Your exam reveals the following findings: left-sided hemotympanum with some clear discharge, multiple abrasions to the right face, the pelvis unstable to rock, and blood in the urethral meatus. On rectal exam, the tone is normal,



although the prostate is difficult to palpate and gross blood is found. There is an obvious deformity to the left femur and an open fracture to the right tibia. Which of the following statements is true regarding this scenario?

1. ☐ Foley catheter placement is critical in this patient to help drain the traumatized bladder.
2. ☐ Immediate head CT takes precedence over other treatments.
3. ☐ Colonoscopy should be performed to diagnose the site of bleeding.
4. ☐ The extraperitoneal urethral injury will require emergent surgery to repair it.
5. ☐ External fixation of pelvic fracture may help maintain hemodynamic stability by reducing retroperitoneal bleeding. ☐

**INCORRECT** ☐

**The correct answer is 5.**

An open book fracture of the pelvis is common in trauma and is associated with disruption of the vertebral venous plexus along the sacrum. This type of fracture can lead to a large amount of retroperitoneal bleeding, requiring blood transfusions and aggressive resuscitation. In this orthopedic emergency, the patient should be stabilized as soon as possible to prevent massive blood loss and third spacing. An easy way to accomplish this goal is application of mast trousers until arrival at the trauma center. Once the patient is at the hospital, an external fixation device should be placed to reduce the fracture and help minimize retroperitoneal bleeding.

**(Choice 1)** This patient has blood found at the external meatus, which is an indication of urethral injury. A retrograde urethrogram should be obtained prior to placement of a Foley catheter.

**(Choice 2)** Following the ABCs of trauma is of utmost priority, and this care should be delivered first before obtaining any imaging modality.

**(Choice 3)** Rectal injuries can occur with traumatic pelvic fractures. Proctoscopy or flexible sigmoidoscopy can be used to help diagnose the location of the lesion, although this is not the most appropriate treatment option at this time.

**(Choice 4)** Extraperitoneal injuries to the bladder are associated with pelvic fractures, especially when the superior and inferior pubic rami are involved. This type of injury is treated nonsurgically with placement of a Foley catheter for a prolonged period of time.

A 23-year-old woman is brought to the emergency department because of severe respiratory distress. She was stung by a bee one hour ago. Her temperature is 37.1 °C (98.8 °F), blood pressure is 80/50 mm Hg, pulse is 98/min and respirations are 20/min. Examination shows a conscious woman in severe respiratory distress with audible wheezing. Her skin is warm to palpation. Which of the following is the most appropriate next step in management?

1. ☐ Give her intravenous steroids
2. ☐ Give her subcutaneous epinephrine ☐
3. ☐ Give her intravenous anti-histamines
4. ☐ Look for the stinger and carefully remove it
5. ☐ Give her oral steroids

**INCORRECT** ☐

**The correct answer is 2.**

This patient is experiencing anaphylactic shock secondary to a bee sting. This is a type 1 hypersensitivity reaction classically mediated by widespread IgE-dependent mast cell and basophil degranulation following exposure to an antigen. The most common causes of such reactions are antibiotics, hymenoptera stings and food. One must have been previously exposed to the offending antigen in order to experience anaphylaxis as the reaction results from preformed IgE, which itself results from a Th2-dependent response to the initial antigen exposure. Patients experiencing anaphylaxis typically first experience pruritus, flushing and urticaria. Respiratory symptoms such as chest tightness, stridor and a “full” or “lumpy” sensation in the throat follow and may ultimately progress to respiratory distress and failure due to laryngeal edema. Widespread histamine-mediated peripheral vasodilation causes hypotension and ultimately circulatory collapse. Anaphylaxis is a medical emergency and should be promptly treated with subcutaneous epinephrine. Epinephrine is effective because it exerts both  $\alpha$  and  $\beta$ -adrenergic effects resulting in vasoconstriction, bronchial smooth muscle relaxation and a decrease in vascular permeability thereby counteracting the primary pathophysiologic disturbances in anaphylaxis.

**(Choices 1 & 2)** Glucocorticoids have no significant immediate effect; however, they may prevent relapse of severe reactions and may be used in patients following the administration of epinephrine.

**(Choice 3)** Antihistamines are useful in facilitating relief of urticaria, angioedema and bronchospasm as ancillary agents, but epinephrine should be given first.

**(Choice 4)** Removing the embedded stinger immediately following the sting is appropriate as the stinging apparatus actively injects venom into the wound for 1 minute after the sting. People who have been stung should remove the bee stinger immediately by any means. Patients with established anaphylactic shock to hymenoptera stings should immediately self-administer epinephrine.

## 316. Question

1 points

## Category: Surgery

A 24-year-old Caucasian female makes an appointment to see an ophthalmologist; she complains that her eyes seep “thick, viscous, yellowish sticky stuff ” that tends to mat her eyelashes, making it difficult for her to open her eyes in the morning. In addition, she says her eyes feel gritty when she blinks, and they appear to her to be “bloodshot.” The sclera are a “pink-red” color, but they do not hurt, and her vision seems normal, although sometimes she has to wipe “gunk” away from her eyeball. Examination reveals a mild photophobia, a normal pupillary reaction to light, and normal intraocular pressure. This woman most likely has which of the following disorders?

1. ☐ Acute viral conjunctivitis
2. ☐ Optic neuritis
3. ☒ Acute bacterial conjunctivitis ☐
4. ☐ Uveitis
5. ☐ Central retinal artery occlusion
6. ☐ Anterior blepharitis

INCORRECT ☐**The correct answer is 3.**

This woman has conjunctivitis. All forms of conjunctivitis share certain features, including a pink or red coloration of the cornea (“pink eye”), a feeling of fine grit in the eye upon blinking, and production of a yellow tinted exudate. The observation that the exudate is sticky and viscous indicates it caused by a bacterial infection. The three most common infectious agents are *Staphylococcus aureus*, *Streptococcus pneumoniae*, and *Haemophilus* species. The latter two are more common in children; *S. aureus* is most common in adults. Infections are termed acute because, as a rule, they clear up spontaneously within 2 weeks; however, a topical antibiotic can be used to typically cure the infection within a few days.

**(Choice 1)** can be distinguished from bacterial conjunctivitis by the observation that the discharge is copious and watery with scant exudate; it too resolves spontaneously, but antibiotic treatment does not accelerate recovery. Children most commonly get viral conjunctivitis. The most common infective agent is adenovirus type 3; it is highly infectious, and rapid dissemination to a full classroom is not unknown.

**(Choice 2)** refers to inflammation of the optic nerve, which may be secondary to multiple sclerosis, glaucoma, or infection, as in tuberculosis or syphilis. There is a sudden unilateral loss of vision and pain on eye movements. The optic disc frequently appears swollen and associated with flame-shaped pericapillary hemorrhages. Intravenous and oral steroid therapies are used for treatment.

**(Choice 4)** is an inflammation of the uveal tract, a space formed by the iris, ciliary body, and choroid.

**(Choice 5)** is characterized by a sudden, almost complete but painless loss of vision in one eye, most commonly in an elderly patient. Retinal examination reveals pallor of the optic disc, edema of the retina, a cherry-red fovea, and bloodless, constricted arterioles.

**(Choice 6)** is a commonly occurring inflammation of the eyelids, skin, eyelashes, and associated glands; it is easily recognized by red-rimmed eyes with scales hanging onto the lashes. The eyes tend to feel irritated and itchy. There may be small peripheral ulcers caused by staphylococci. Effective home therapy is often achieved by removing the scales from the lid margins on a daily basis with a damp cloth or cotton wad, using baby shampoo as an emulsifier, and by keeping the face and scalp exceptionally clean. In some cases, an antibacterial ointment is also used.

317. Question

1 points

Category: Surgery

A 25-year-old male is brought to the trauma center by the paramedics after being involved in a road traffic accident that occurred 90 minutes ago. He was a front seat passenger in a 3-car accident. His initial blood pressure at the scene of the accident was 90/60 mm Hg and pulse was 126/min. The paramedics administered 2 liters of normal saline in the ambulance. In the ED, his blood pressure is 110/70 mm Hg and pulse is 90/min. His abdomen is tender in the left upper quadrant. Ultrasound shows fluid in the spleno-renal angle. The most appropriate next step is to:

1. ☐ Perform exploratory laparotomy
2. ☐ Perform a CT scan ☒
3. ☐ Admit to the surgical ICU
4. ☐ Admit to the ward
5. ☐ Laparoscopy

**INCORRECT** ☐

**The correct answer is 2.**

This patient seems to have sustained some sort of splenic injury, as evidenced by tenderness in the upper left quadrant and visible fluid in the spleno-renal angle. Within the abdomen, the spleen is the most fragile organ that gives rise to clinically significant bleeding. The immediate management of splenic trauma due to blunt abdominal injury depends on the patient's hemodynamic status and response to IV fluids. If the patient is hemodynamically unstable and unresponsive to fluid administration, then emergent exploratory laparotomy is required. If the patient responds to fluids (SBP >100 mm Hg) and does not require blood (as

in this case), performing an abdominal CT scan is the best next step. In the case of CT scan-documented splenic injury, the decision for operative intervention is determined by the grade of the injury. If operative intervention is required, every effort is made to repair the spleen rather than remove it, especially in children. If removal is unavoidable, post-operative immunization against encapsulated bacteria is mandatory.

**(Choice 1)** Immediate exploratory laparotomy is unnecessary in this patient because he became hemodynamically stable after the fluid challenge.

**(Choice 3)** Admitting the patient to the surgical ICU for monitoring would be reasonable if the CT scan shows that no operation is required.

**(Choices 4 & 5)** Admitting the patient to the ward or laparoscopy has no role in the management of splenic rupture.

### 318. Question

1 points

#### Category: Surgery

A 19-year-old gang member is shot in the abdomen with a .38 caliber revolver. The entry wound is in the epigastrium, to the left of the midline. The bullet is lodged in the psoas muscle on the right. He is hemodynamically stable, and the abdomen is moderately tender. Which of the following is the most appropriate next step in diagnosis?

1. ☐ Close clinical observation
2. ☐ Emergency ultrasound
3. ☐ CT scan of the abdomen
4. ☐ Diagnostic peritoneal lavage
5. ☐ Exploratory laparotomy ☒

**INCORRECT** ☐

**The correct answer is 5.**

The abdomen is full of important structures that should not have holes in them: solid organs that can bleed, and hollow viscera that will spill “evil fluids” into the peritoneal cavity. Thus, the rule for abdominal gunshot wounds is simple: an exploratory laparotomy should be done in every case, before there are obvious signs of either bleeding or peritonitis.

**(Choice 1)** is not wise; since the risk of complications will increase the longer one waits.

**(Choices 2,3 & 4)** Ultrasound, CT of the abdomen, and diagnostic peritoneal lavage are used to assess the extent of internal damage in blunt abdominal trauma. They would be of little benefit in an abdominal gunshot wound.

## 319. Question

1 points

**Category: Surgery**

A 60-year-old man undergoes a laparotomy for intestinal obstruction secondary to postoperative adhesions. He has a history of diabetes mellitus, type 2, and hypertension. He underwent a cholecystectomy two years ago. He takes insulin, hydrochlorothiazide, enalapril, and pravastatin. On postoperative day number five, he has intense pain around the wound. His temperature is 38.3 °C (101 °F), blood pressure is 120/76 mm Hg, pulse is 100/min, and respirations are 16/min. Examination of the wound shows a cloudy-gray discharge and crepitus; sensation at the edges of the wound is decreased. Which of the following is the most appropriate next step in management?

1. ☐ Surgical exploration ☐
2. ☐ Anti-staphylococcal antibiotics
3. ☐ Culture the discharge
4. ☐ Improve glycemic control
5. ☐ Observation

**INCORRECT** ☐**The correct answer is 1.**

This patient presents with signs and symptoms suggestive of necrotizing surgical infection. The clues to the correct diagnosis include:

1. Intensive pain in the wound accompanied with fever and tachycardia
2. Decreased sensitivity at the edges of the wound
3. cloudy-gray discharge.

Diabetes is an important predisposing condition. The necrotizing surgical infection is usually caused by mixed gram-positive and gram-negative flora. The treatment of the necrotizing surgical infection is complex. The most important step in the management of this condition is early surgical exploration to assess the extent of the process and debride the necrotized tissues. Antibiotics are also important, but *S. aureus* is a less frequent pathogen causing this condition.

**(Choice 4)** General measures should include adequate hydration and glycemic control, but surgical exploration is more urgent.

**(Choice 3)** The discharge should be cultured, although the results are delayed.

**(Choice 5)** Observation is not appropriate, because the infection spreads very quickly and is life threatening.



**Category: Surgery**

A 51-year-old obese woman was admitted to the hospital for recurrent pain in the right upper quadrant of her abdomen that radiated to the back. She also complained of occasional nausea and vomiting, but revealed no other relevant medical history. At that time, her vital signs were normal, and she had no icterus, pallor, or cyanosis. Tenderness was present to palpation in the right upper abdominal quadrant: there was no guarding or rigidity. No organomegaly was noted, and no masses were felt. Bowel sounds were normal. Findings of examinations of the cardiovascular and respiratory systems were normal. Her electrolytes and serum chemistries were normal except for a mild leukocytosis. Ultrasound confirmed cholelithiasis, for which she underwent laparoscopic cholecystectomy under general anesthesia. She now has an IV line in place, together with an indwelling urinary catheter and a nasogastric tube. Twenty-four hours after the procedure, she develops fever, tachycardia, sudden difficulty breathing, and pain in the chest. The most likely cause for this patient's current condition is which of the following?

1. ☐ Pulmonary embolus
2. ☐ Postoperative wound infection
3. ☐ Atelectasis ☒
4. ☐ IV catheter-related sepsis
5. ☐ Spontaneous pneumothorax
6. ☐ Aspiration pneumonitis

**INCORRECT** ☒

**The correct answer is 3.**

The word atelectasis implies that there has been no expansion of the lung tissue. Nevertheless, it is the term used to describe the postoperative condition in which small airways and alveoli lose their patency and collapse. It is the most common complication following general anesthesia. Patients with nasogastric tubes are at higher risk to develop this. Under normal circumstances, alveoli do collapse but expand thereafter because of release of surfactant. Taking deep breaths stimulates release of surfactant in the normal individual. As a result of pain following surgery, the patient cannot take deep breaths, and the tidal volumes are also low. This inhibits the release of surfactant, leading to collapse of the alveoli. If the patient has tenacious sputum, this in turn will aggravate the situation further. Clinically, rales, diminished breath sounds, tachycardia, and fever all point to this diagnosis. Pain may or may not be a feature. Chest radiography may demonstrate atelectasis even in the absence of clinical signs. Most often, atelectasis is patchy and does not involve large segments of the lung. Treatment involves clearing the secretions and promoting expansion of the lungs. Physiotherapy, nebulized mucolytic agents, deep breathing exercises, incentive spirometry, and early ambulation are helpful.



**(Choice 1)** is a sudden event that usually occurs several days after surgery and is usually due to venous stasis in the calf secondary to deep venous thrombosis. Breakage of the clot leads to a shower of emboli that commonly enter the pulmonary circulation. A massive embolus could be fatal immediately. It has even been known to happen so rapidly that a patient stops talking in midsentence. In other cases, the patient will complain of sudden chest pain and shortness of breath and have hemoptysis. Tachycardia and hypotension also occur. Dyspnea and tachycardia are the most frequent clinical features, and there will be an audible split pulmonary second sound on auscultation. Some patients will have gallop rhythm and cyanosis.

**(Choice 2)** Postoperative wound infections are more common in the 5 to 10-day postsurgical period.

**(Choice 4)** usually results in thrombophlebitis at the site of cannulation. Its frequency is much greater if it is done in the lower extremities. Hence this route is reserved only if no venous access is available elsewhere. Fever due to phlebitis usually occurs on the third postoperative day. The local area is inflamed and tender. If it leads to a suppurative phlebitis, the patient looks very ill. Tachycardia and hypotension may ensue together with tachypnea. Chest pain is unusual. Removing and relocating the intravenous catheter is essential. Blood samples should be drawn and sent for culture and sensitivity together with the tip of the catheter, and antibiotics started.

**(Choice 5)** is a cause of atelectasis. It is associated with chest pain, difficulty breathing, and tachycardia. Fever is not a feature.

**(Choice 6)** is associated with dyspnea, cyanosis, and tachycardia. It usually occurs within half an hour after aspiration. Clinical examination will reveal wheezes and rales. Respiratory failure could ensue.

### 321. Question

1 points

#### Category: Surgery

A 52-year-old man has been impotent ever since he had an abdominoperineal resection for cancer of the rectum. The tumor was staged as T3, N0, M0. He gets no nocturnal erections, and his impotence extends to all situations, regardless of sexual partner, and includes inability to masturbate. His erectile dysfunction is most likely due to which of the following?

1. ☐ Arterial vascular insufficiency
2. ☐ Erectile nerve damage ☐
3. ☐ Psychogenic factors
4. ☐ Tumor invasion of the urethra
5. ☐ Venous incompetence

**INCORRECT** ☐

**The correct answer is 2.**

A well-known risk of abdominoperineal resection is damage to the erectile nerves, as the rectum is widely dissected away from the pelvic walls. A 50% incidence of postoperative impotence is commonly quoted. "Nerve sparing" surgery can be done if the dissection is closer to the rectal wall, but the extent of the tumor may preclude it. A T3 (which this man had) is a large, bulky, primary tumor.

**(Choice 1)** will lead to impotence either of sudden onset after perineal trauma (motorcycle accident, for instance) or of very gradual development in chronic vascular disease.

**(Choice 3)** has a sudden onset but is partner-or situation-specific. Typically, nocturnal erections are preserved, as is the ability to masturbate.

**(Choice 4)** Tumor invasion, if it is into the pelvic tissues, may indeed require a dissection that damages the nerves, but the problem would not involve the urethra.

**(Choice 5)** is a common source of organic impotence, which would have gradual onset and no connection with pelvic surgery.

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### 322. Question

**1 points**

#### **Category: Surgery**

A 36-year-old woman presents to the emergency department with severe epigastric pain and right shoulder pain of about two hours duration. She also reports having one episode of emesis. When asked about her diet, she explains that she unintentionally fasted yesterday and had a large meal two hours ago. Her past medical history is significant for frequent heartburn for which she takes ranitidine. Several hours after presenting, the patient's pain resolves completely. Which of the following best explains this episode?

1. ☐ Viscus distention ☐
2. ☐ Acid hypersecretion
3. ☐ Peritoneal irritation
4. ☐ Mucosal inflammation
5. ☐ Vascular obstruction

**INCORRECT** ☐

**The correct answer is 1.**

This is the classic presentation of biliary colic secondary to gallstones. Ingestion of a fatty meal causes the gallbladder to contract, which can press gallstones against the cystic duct opening, increasing intra gallbladder pressure and causing distension and colicky pain.

Subsequent gallbladder relaxation allows the stone to fall back from the duct, causing the pain to resolve completely. Biliary colic is often accompanied by nausea, vomiting, and right-sided shoulder or subscapular discomfort (referred pain). The pain of biliary colic is distinguished from that of acute cholecystitis by its intermittent nature and relation to meals as well as the absence of fever.

**(Choice 2)** Heartburn can occur secondary to gastric acid hypersecretion. However, this patient's symptoms are more consistent with biliary colic than dyspepsia.

**(Choice 3)** Peritoneal irritation causes peritoneal signs like rebound tenderness, abdominal guarding and decreased bowel sounds.

**(Choice 4)** In acute cholecystitis, there is inflammation of the gallbladder mucosa. As described above, the intermittent nature of this patient's symptoms and the lack of fever and leukocytosis make biliary colic a more likely diagnosis than acute cholecystitis.

**(Choice 5)** Bowel ischemia typically causes severe abdominal pain out of proportion to findings on physical exam. The pain is often periumbilical and may be accompanied by nausea, vomiting, and fecal blood.

### 323. Question

1 points

#### Category: Surgery

A 19-year-old man is involved in a motorcycle accident in which he sustains a closed fracture of his right femur and a pelvic fracture. In addition to the obvious deformity in his leg, physical examination is remarkable for the presence of a scrotal hematoma and blood at the meatus. There is no blood in the rectal exam, but the prostate cannot be felt. The patient states that he feels the need to void, but cannot do it. Which of the following is the most appropriate next step in diagnosis?

1. ☐ CT scan of the pelvis
2. ☐ Scrotal sonogram
3. ☐ IV pyelogram (IVP)
4. ☐ Retrograde cystogram via Foley catheter
5. ☐ Retrograde urethrogram ☐

**INCORRECT** ☐

**The correct answer is 5.**

The hallmark of a urologic injury is a trauma patient who has blood in the urine (or in the visible part of the urinary tract, as in this case). When a pelvic fracture is also present, we have to bet on the lower urinary tract: the bladder in either gender, or the bladder or urethra in the male. When the blood is visible at the meatus and you add the scrotal hematoma, the "vanishing" prostate, and the inability to void, the writing is on the wall: urethral injury. The last

thing you want to do in this case is insert a Foley catheter; you might convert a partial urethral disruption into a complete transection. You want to inject the dye directly into the urethra (retrograde urethrogram).

**(Choice 1)** might be needed to assess pelvic bleeding (if we had been told that this man was in shock), but it would not be the best way to detect a urethral leak.

**(Choice 2)** can tell you whether the testicle is injured, but a ruptured testicle does not give you blood in the urinary tract.

**(Choice 3)** would be a round-about and unreliable way to get radiopaque material where you need it.

**(Choice 4)** As pointed out above, inserting a Foley catheter to do a cystogram would be absolutely contraindicated if the clinical picture suggests urethral injury.

### 324. Question

1 points

#### Category: Surgery

A 65-year-old woman presents to the emergency department with diffuse abdominal pain and vomiting. She has not had a bowel movement in the past 3 days. Physical examination reveals hyperstasis, tympany to percussion, and no rebound tenderness. Her temperature is 38°C (100.4°F). An abdominal x-ray film reveals distended loops of small bowel with a stepladder pattern of differential air–fluid levels. Which of the following is the mechanism that most likely produced these findings?

1. ☐ Diverticulosis
2. ☐ Adhesions from previous surgery ☐
3. ☐ Torsion of the bowel around the mesenteric root
4. ☐ Intussusception of the terminal ileum into the cecum
5. ☐ Ischemia secondary to thrombosis of the superior mesenteric artery

**INCORRECT** ☐

**The correct answer is 2.**

The patient has a small bowel obstruction, which is most commonly caused by adhesions from a previous surgery. Characteristic physical findings in small bowel obstruction are vomiting, colicky midabdominal pain, abdominal distention, hyperperistalsis, obstipation (i.e., absence of stool and flatus), and a lack of rebound tenderness. Abdominal x-ray films show distended loops of bowel with a “stepladder” pattern of differential air–fluid levels. In some cases, intestinal intubation relieves the entrapped gas and fluids, causing the obstruction to subside. Other cases require surgical intervention.

(Choice 1) usually causes no symptoms, and non-inflamed diverticula are generally discovered by chance during an ancillary examination such as a colonoscopy for cancer screening.

(Choice 3) is a volvulus. It produces obstruction and strangulation of bowel.

(Choices 1 & 4) (Choice 4) is uncommon in adults and produces a combination of obstruction and infarction. Generally, a small bowel infarction resulting from thrombosis over an atherosclerotic plaque in the proximal superior mesenteric artery causes bloody diarrhea (Choice 1). "Thumbprinting" from submucosal edema is noted in barium studies.

### 325. Question

1 points

#### Category: Surgery

Forty-eight hours after a total hysterectomy for low-staged endometrial carcinoma, a 35-year-old woman, with a 20 pack-year history of smoking, presents with the sudden onset of tachypnea, dyspnea, cough, and right-sided pleuritic chest pain. She has a low-grade fever, sinus tachycardia, and a blood pressure of 100/70 mm Hg. Examination of the chest shows scattered, bilateral expiratory wheezes and dullness to percussion at the right lung base. No calf tenderness is present. A chest radiograph shows a small pleural effusion at the right lung base, as well as a wedge-shaped area of hypo-vascularity and atelectasis in the right lower lobe. An electrocardiogram (ECG) shows nonspecific ST and T-wave abnormalities. An arterial blood gas (ABG) sample drawn with the patient breathing room air reveals a pH of 7.50 (normal is 7.35–7.45), a PaCO<sub>2</sub> of 29 mm Hg (normal is 33–44 mm Hg), a PaO<sub>2</sub> of 70 mm Hg (normal is 75–105 mm Hg), and a bicarbonate level of 21 mEq/L (normal is 22–28 mEq/L). Which of the following is the most appropriate first step in the management of this patient?

1. ☐ Perform a pleural tap.
2. ☐ Order a perfusion scan of the lungs. ☐
3. ☐ Order a sputum analysis for Gram's stain, culture, and sensitivity.
4. ☐ Order pulmonary function tests.
5. ☐ Order a consultation for bronchoscopy.

INCORRECT ☐

**The correct answer is 2.**

This woman has a pulmonary embolus with infarction, a condition most commonly seen in the setting of postoperative recovery associated with stasis of the venous circulation in the proximal (femoral) veins of the leg, the most common location (90%) for thromboembolism. Signs and symptoms depend on the size of the embolus. Large saddle emboli that block four of the five pulmonary artery orifices result in sudden death because of acute strain on the

right side of the heart. Small emboli lodge peripherally, where they produce an infarction in fewer than 10% of patients. Infarction is more likely in patients with preexisting lung disease, such as seen in heart failure or in chronic obstructive lung disease. Pulmonary angiography is the gold standard test for diagnosing a pulmonary embolus, particularly when other studies give conflicting results. However, most clinicians begin with a perfusion scan of the lungs, which has a high probability of indicating an infarction if a lobar perfusion defect accompanies ventilation mismatch, the latter demonstrated by a ventilation scan. Perfusion defects last 7–14 days.

**(Choices 1,3,4 & 5)** A pleural tap, Gram's stain with culture and sensitivity of sputum, pulmonary function studies, and a bronchoscopy are noncontributory in the initial workup of a pulmonary embolus.

### 326. Question

1 points

#### Category: Surgery

A 16-year-old boy was brought to the emergency department because of left shoulder and left hand pain after falling on his outstretched hand while playing soccer. He heard a crunching sound and had intense pain in his left shoulder area following the injury. Examination shows bruising around the clavicle area. He is holding his left arm with his right hand. There is a palpable gap in the middle of the clavicle. Auscultation shows a loud bruit just beneath the clavicle. An x-ray film of the left shoulder and chest shows the middle of the clavicle is fractured and displaced. Which of the following is the most appropriate next step in management?

1. ☐ CT chest for pneumothorax
2. ☐ Nerve conduction studies
3. ☐ Angiogram ☐
4. ☐ Open reduction of the clavicle
5. ☐ Closed reduction with figure of eight brace

**INCORRECT** ☐

**The correct answer is 3.**

The clavicle is one of the most commonly injured bones in the body. The majority of clavicular fractures occur in the middle third of the bone. Injury to this bone classically occurs during athletic events and follows a fall on an outstretched arm or a direct blow to the shoulder. Patients with clavicular fractures present with pain and immobility of the affected arm. The contralateral hand is classically used to support the weight of the affected arm. The shoulder on the affected side is displaced inferiorly and posteriorly. A careful neurovascular

exam should accompany all fractures to the clavicle due to its proximity to the subclavian artery and brachial plexus. In this case, a bruit is heard and an angiogram is necessary to rule out injury to the underlying vessel.

**(Choice 1)** The patient already has had a chest x-ray, which is sufficient to make the diagnosis of a clinically relevant pneumothorax.

**(Choice 2)** A clavicle fracture may rarely injure the brachial plexus. While brachial plexus injury may be assessed with nerve conduction studies, clinical examination of motor function of the hand and arm is sufficient.

**(Choices 4 & 5)** Fractures of the middle third of the clavicle, which account for most clavicular fractures, are treated non-operatively with a brace, rest and ice. Fractures of the distal third of the clavicle may require open reduction and internal fixation to prevent nonunion. In cases managed non-operatively, early range of motion and strengthening are recommended to prevent loss of motion at the shoulder.

### 327. Question

1 points

#### Category: Surgery

A 65-year-old woman had a 5-year history of pain in the right hip that had gradually gotten worse. She had reached a point where she hobbled with the help of a cane. Nonsteroidal analgesics did not help her very much. She finally agreed to undergo surgery. An x-ray film of the right hip confirmed severe osteoarthritis. There was no osteoporosis. The orthopedic surgeon recommended hip arthroplasty, and she was admitted to the hospital. She was considered at high risk for deep venous thrombosis, and heparin prophylaxis was begun. Which of the following is the best test to monitor heparin therapy?

1. ☐ Thrombin time (TT)
2. ☐ Prothrombin time (PT)
3. ☐ Prothrombin and proconvertin test
4. ☐ Activated partial thromboplastin time (aPTT) ☒
5. ☐ Bleeding time

**INCORRECT** ☐

**The correct answer is 4.**

Heparin blocks the intrinsic pathway of the coagulation cascade, and its activity can be measured by determining the activated partial thromboplastin time (aPTT). The intrinsic system begins with the conversion of factor XII to an active enzyme called XIIa once it has



come into contact with negatively charged surfaces. In addition to monitoring adequacy of heparinization, aPTT is used to monitor replacement therapy in hemophilia A and B. The therapeutic range for aPTT is 1.5–2.5 times the reference range.

**(Choice 1)** is used to screen for abnormalities of fibrinogen. It measures conversion of fibrinogen to fibrin by thrombin. This is accomplished by polymerization of fibrin polymers to a fibrin gel. TT does not measure fibrinolysis or stabilization of fibrin. The most common cause of prolongation of TT is heparin; however, prolongation can also occur in uremia and defects in fibrin (e.g., dysfibrinogenemia, hypofibrinogenemia). Thus, although heparin prolongs TT, it is not used as a test to monitor heparin therapy. The fact that the TT is not due to heparin can be determined by blocking its action with protamine sulfate or, even better, measuring the reptilase time. Reptilase time is most commonly used to determine the cause of prolonged TT. Reptilase is an enzyme obtained from the venom of a reptile, *Bothrops atrox*, which clots human fibrinogen.

**(Choice 2)** blocks the extrinsic pathway (e.g., after oral anticoagulation). The extrinsic portion of the coagulation cascade is initiated by the interaction between factor VII and tissue factor. The PT is normal in patients who are on heparin alone, because heparin acts on the intrinsic pathway.

**(Choice 3)**, an assay of prothrombin (factor II) and proconvertin (factor VII), is actually a modified PT in which factor V and fibrinogen are added to it. Thus, the assay is sensitive to defects in factors II, VII, and X. It can be used to monitor oral anticoagulant therapy, not heparin therapy. The test is usually reported in terms of percentage of activity based on a series of normal plasmas diluted with normal saline. This test is no longer used, because it has no advantage over the PT or the international normalized ratio (INR). Furthermore, results from prothrombin and proconvertin tests cannot be converted to INR values.

**(Choice 5)** measures the interaction between platelets and the vessel wall. Defects in platelets or a defect in the vessel wall will result in a prolonged bleeding time. It is the most commonly used test to measure in vivo platelet function. The most common cause for prolonged bleeding time is drug therapy, especially aspirin. Patients with von Willebrand disease also have prolonged bleeding time due to a deficiency or abnormality in von Willebrand's factor. Von Willebrand disease is the most common hereditary bleeding disorder.

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### 328. Question

1 points

#### Category: Surgery

A 27-year-old man has bulky retroperitoneal adenopathy after radical orchiectomy for a mixed germ cell tumor. His chest x-ray is normal. Serum beta-human chorionic gonadotropin ( $\beta$ -hCG) and alpha-fetoprotein (AFP) are markedly elevated. liver enzymes are slightly elevated, and the patient relates a history of ethanol excess. He receives three cycles of chemotherapy. Restaging reveals a 3-cm retroperitoneal mass, a normal chest x-ray, and normal serum  $\beta$ -hCG. However, the serum AFP is 20 IU/ml (normal = 0 to 9 IU/ml). What is the next step in the management of this patient?

1. ☐ Computed tomography (CT) guided needle biopsy
2. ☐ External-beam radiotherapy
3. ☐ Retroperitoneal lymph node dissection ☐
4. ☐ Salvage chemotherapy
5. ☐ Serial markers and CT scans

**INCORRECT** ☐

**The correct answer is 3.**

This patient presents with a residual bulky mass after three courses of platinum-based chemotherapy. Although the chest x-ray and  $\beta$ -hCG are normal, the serum AFP remains slightly elevated. AFP production is usually attributed to yolk sac elements in a mixed germ cell tumor. It is also seen with a number of other conditions, such as hepatocellular carcinomas and benign hepatic disease, including alcohol hepatitis, as is probable in this case. Patients with persistent marker elevations after chemotherapy are usually considered very likely to harbor residual carcinoma and probably best managed by further chemotherapy. However, the AFP elevation seen in this case is more likely due to benign liver disease. Consequently, this patient would be best managed by retroperitoneal lymph node dissection instead. The most likely finding at retroperitoneal lymph node dissection would be either fibrosis or residual teratoma. CT scan-directed percutaneous needle biopsy would have considerable sampling error, and external beam radiotherapy has no efficacy, particularly in the management of teratoma. Further observation is usually not warranted in patients who have residual retroperitoneal masses in excess of 2 to 3 cm.

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### 329. Question

**1 points**

#### **Category: Surgery**

A 34-year-old male is brought to the emergency department by the paramedics after a gunshot injury. His temperature is 37 °C (98.8 °F), blood pressure is 110/60 mm Hg, pulse is 96/min and respirations are 18/min. Examination shows a gunshot entry wound in the left 6th intercostal space anteriorly just lateral to the midclavicular line, and an exit wound in left 7th intercostal space posteriorly. After completing the primary survey by attending to airway, breathing and circulation, which of the following is the most appropriate next step in management?

1. ☐ Place a chest tube
2. ☐ Do a diagnostic peritoneal lavage
3. ☐ Pericardiocentesis

4. ☐ Do an exploratory laparotomy ☐

5. ☐ Do a thoracotomy

**INCORRECT** ☐

**The correct answer is 4.**

All gunshot wounds that are reasonably believed to have penetrated the peritoneum require exploratory laparotomy. This differs from the current management of stab wounds and other penetrating trauma, which may be observed and treated conservatively in some cases, because of the blast effect of the bullet. The trajectory of the bullet described certainly penetrated the pleura and the abdominal cavity at the dome of the diaphragm on the left where the spleen and gastric fundus resides. The purpose of laparotomy in such cases is to ensure that there is no life-threatening injury, such as bowel trauma or hemorrhage. Any gunshot wound below the anterior 4th intercostal space (approximately the level of nipple) is considered to involve the abdomen.

**(Choice 2)** Diagnostic peritoneal lavage and focused assessment with sonography for trauma (FAST) exams are helpful but are not yet sufficiently sensitive to replace exploratory laparotomy in abdominal gunshot wounds.

**(Choices 1,3 & 5)** The patient described is hemodynamically stable and is unlikely to have sustained damage to the heart or pericardium given the trajectory of the wound and his clinical presentation. Severe hemothorax or pneumothorax would cause respiratory distress and may be treated with a chest tube; small hemothoraces and pneumothoraces may be observed.

330. Question

1 points

**Category: Surgery**

A 68-year-old male undergoes colon resection surgery for diverticulosis. In the 24 hours following the surgery, he passes a total of 300 ml of urine. His past medical history is significant for coronary artery disease, right knee osteoarthritis and moderate chronic obstructive pulmonary disease. On physical examination, his blood pressure is 110/70 mm Hg and his heart rate is 90/min. His lungs are clear to auscultation and his abdomen is soft and non-distended. His current labs are given below:

**Hemoglobin:** 9.5 mg/dl

**WBC count:** 13,000/mm<sup>3</sup>

**Platelet count:** 160,000/mm<sup>3</sup>

**Sodium:** 138 mg/dl

**Potassium:** 5.1 mg/dl

**Glucose:** 108 mg/dl

**Creatinine:** 2.3 mg/dl

**BUN:** 82 mg/dl

His indwelling bladder catheter is changed but no residual urine is drained. Which of the following is the best next step in managing this patient?

1. ☐ Furosemide
2. ☐ Bolus of IV fluids ☐
3. ☐ Mannitol
4. ☐ Low-dose dopamine infusion
5. ☐ Intravenous pyelography

**INCORRECT** ☐

**The correct answer is 2.**

In patients without preexisting intrinsic kidney disease, oliguria is defined as less than 400cc, as or less than 6cc/kg, of urine output per day. The patient described above has a blood pressure in the low range of normal and a heart rate in the high range of normal. This information, coupled with the patient's low hemoglobin, makes volume depletion secondary to intraoperative blood loss the most likely diagnosis. Volume depletion causes poor renal perfusion leading to prerenal azotemia and oliguria. The elevated BUN/Cr ratio of 36 (normal is 10) further supports this notion. Determination of the fractional excretion of sodium, which cannot be done with the laboratory values provided, is also useful in distinguishing between prerenal azotemia ( $FE_{Na} < 1$ ) and intrinsic renal disease ( $FE_{Na} > 1$ ). The first step in the management of any patient with new-onset oliguria should be to change the Foley catheter to ensure that it is not clogged. Next, if prerenal azotemia is suspected, a careful fluid challenge is indicated.

**(Choices 1 & 3)** Diuresis would worsen this patient's volume depleted status. Furosemide and mannitol are sometimes used in normovolemic patients with intrarenal causes of acute oliguria, like rapidly progressive glomerulonephritis and toxic acute tubular necrosis. Dialysis is also frequently needed in these cases.

**(Choice 4)** A low-dose dopamine infusion would dilate the renal arterioles thereby increasing the GFR and urine output. In this setting, dopamine might temporarily increase the patient's urine output but would not restore his intravascular volume.

**(Choice 5)** An intravenous pyelogram is not indicated in this patient. This test is most commonly used to diagnose renal calculi, but may also assist in diagnosing genitourinary neoplasms and papillary necrosis.

**Category: Surgery**

A 40-year-old female is brought to the emergency department following a motor vehicle accident in which she was the front seat passenger. She reports hitting her head against the windshield and hurting her right leg. She appears completely alert and oriented. Glasgow Coma Scale= 15/15. Her pupils are equal and reactive to light. There is a bruise over the right forehead, but no tenderness is present on palpation of the cranial bones. Examination of the right leg reveals a hematoma over the thigh. Knee extension on the right is markedly reduced when compared to the left. Sensory examination reveals decreased sensory perception to both sharp and dull stimuli over the right lower medial leg. All other dermatomes are intact. What nerve injury is most likely present in this patient?

1. ☐ Femoral nerve ☐
2. ☐ Tibial nerve
3. ☐ Obturator nerve
4. ☐ Common peroneal nerve
5. ☐ Fibular nerve

**INCORRECT** ☐

**The correct answer is 1.**

This question requires that you recall the neuroanatomy of the lower limb. This patient has a femoral nerve injury. The femoral nerve innervates the muscles of the anterior compartment of the thigh (i.e., quadriceps femoris, sartorius, pectineus), and is therefore responsible for knee extension and hip flexion. It provides sensation to the anterior thigh and medial leg via the saphenous branch.

**(Choice 2)** The tibial nerve supplies the muscles of the posterior compartment of the thigh, posterior compartment of the leg, and plantar muscles of the foot. These muscles control flexion of the knee and digits, and plantar flexion of the foot. The tibial nerve provides sensation to the leg (except medial side) and plantar foot.

**(Choice 3)** The obturator nerve innervates the medial compartment of the thigh (i.e., gracilis adductor longus, adductor brevis, anterior portion of adductor magnus), and controls adduction of the thigh. It provides sensation over the medial thigh.

**(Choice 4)** The common peroneal nerve gives rise to the superficial and deep peroneal nerves. These two nerves supply the muscles of the anterior and lateral leg. These nerves provide sensation to the anterolateral leg and dorsum of the foot.

**(Choice 5)** The fibular nerve is another name for the common peroneal nerve.

**Category: Surgery**

A 36-year-old male comes to the emergency department because of worsening right lower quadrant (RLQ) abdominal pain. One week ago he was started on cephalexin for furunculosis. He has had type I diabetes mellitus for 10 years and is on insulin. His temperature is 38.3 °C (101.9 °F). Examination shows multiple furuncles on the inner side of both thighs; most of them are in regression. Abdominal examination shows tenderness on deep palpation in RLQ without rebound or guarding; no masses are palpated; psoas sign is positive; bowel sounds are present. Rectal examination shows no abnormalities. Laboratory studies show:

**Hemoglobin:** 13.0 g/L

**Leukocyte count:** 17,500/mm<sup>3</sup>

Which of the following is the most appropriate next step in management?

1. ☐ Appendectomy
2. ☐ Laparoscopy
3. ☐ CT of abdomen ☐
4. ☐ Colonoscopy
5. ☐ AP and lateral lumbar films

**INCORRECT** ☐

**The correct answer is 3.**

The patient described most likely has a psoas abscess resulting from hematogenous spread of bacteria from his many furuncles. He has no guarding, rigidity or rebound tenderness in the right lower quadrant making the diagnosis of appendicitis unlikely. In acute appendicitis, patients initially have vague periumbilical pain that subsequently localizes to right lower quadrant. Patients with a psoas abscess typically present with fever and lower abdominal or back pain. Deep abdominal palpation is required to elicit tenderness due to the deep location of the psoas on the posterior abdominal wall. As with any infectious process, leukocytosis is evident on laboratory tests. A CT scan is required to confirm the diagnosis. A psoas abscess may also result from contiguous spread from nearby bone or bowel.

**(Choice 1)** As discussed, the clinical scenario is not consistent with appendicitis. An appendectomy in this situation would not benefit the patient.

**(Choice 2)** If the clinical suspicion of psoas abscess is high and CT is negative, exploratory laparoscopy may be indicated to identify the primary pathology. Patients with psoas abscess are treated with drainage and systemic antibiotics. Drainage may be accomplished without laparotomy or laparoscopy by placement of a percutaneous drainage tube.

**(Choice 4)** Colonoscopy may be beneficial if the primary pathology is felt to be in the colon. Examples of colonic diseases that cause lower abdominal pain are diverticulitis, Crohn disease, perforating carcinoma of the cecum and yersiniosis.

☐ (<https://www.ibm.com/docs/en/ibm-quantum/openstack/6.0.0?topic=installing-openstack-on-a-kubernetes-cluster>)

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